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ECONOMIC AFFAIRS

No. 1056

EKO: ECONOMICS AND ORGANIZATION
OF INDUSTRIAL PRODUCTION

No. 3, March 1983

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REMUNERATION SHOULD REFLECT GOALS OF LABOR EFFICIENCY, ENHANCE LIVING STANDARDS

Novosibirsk EKO: EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA in Russian No 3, Mar 83 (signed to press 26 Jan 83) pp 3-14

[Article by L. E. Kunel'skiy, doctor of economic sciences, professor, division chief of USSR State Committee for Labor and Wages (Moscow): "Increasing the Motivating Role of Wages"]

[Text] Control of wages is one of the important constituent parts of the party policy. Wages are a most important source of forming the incomes of the workers and improving their well-being. On the other hand, this is an extremely effective means of influencing the productivity and quality of labor, and this means the country's economy as a whole. This is precisely the way the tasks in this area were formulated at the 26th CPSU Congress.

The magazine has repeatedly discussed earnings in terms of the unity of their properties. Among the concrete problems that have already been dealt with on the pages of EKO is the role of earnings in fulfilling the tasks of the Ninth, Tenth and Eleventh Five-Year Plans, improvement of norm setting for labor, the possibilities and results of introducing new wage rate conditions, remuneration among the motives for labor turnover, factors that determine the structure and amounts of earnings, rayon regulation of earnings, and so forth.

In addition to presenting advanced practice, particularly in terms of administration and forms of organization and stimulation of labor, the magazine also turns to questions of the theory of material incentives. For example, in the opinion of the deputy chairman of the USSR State Committee for Labor and Wages, B. M. Sukharevskiy, concerning payment for labor with collective forms of its organization is interesting (1979, No 11).

Essential considerations of the patterns and the shortcomings in the dynamics of wages are expressed by M. I. Belkin and V. A. Volkonskiy (EKO, 1982, No 10).

Against this background, the position expressed in the article by the chief of one of the divisions of the State Committee for Labor and Wages, L. E. Kunel'skiy, is also of interest.

Growth Rates and Proportions

Wages can be used to solve social and economic problems, not only by raising their level, but also by improving the mechanism for organizing them.

Under the Eleventh Five-Year Plan the national income is to increase by 78.4 billion rubles as compared to 74.5 billion under the Tenth Five-Year Plan. Additionally, the necessary economic prerequisites are being created for redistribution of the national income so as to raise the standard of living of the people. The proportion of the consumption fund in 1985 should increase to more than 77 percent of the national income as compared to 75.3 percent in 1980. By the end of the current five-year plan it will be possible to use approximately 15 billion additional rubles to improve public well-being, and measures have also been earmarked for improving the balance between income and commodities. As a result, the influence of material stimuli on work indicators should increase.

When considering the objective economic and social prerequisites for increasing the amounts of average earnings it is necessary to take note of such an important factor as the essential reduction of the growth of labor resources and the number of workers and employees in forthcoming years. Thus in the overall increase in the wage fund there is a greater proportion of funds used for increasing the average amounts (percentages):

	1976-1980	1981-1985 (calculation)
for increase in number of workers	37	22
for increasing average earnings	63	78

A most important task in the area of organizing wages consists in increasing their influence on work indicators, and primarily on the rates of increase in labor productivity, economy on raw and processed material resources, and improvement of qualitative indicators. In this connection it is important to establish more substantiated and economically and socially justified ratios between the rates of increase in labor productivity, the increase of average wages and the overall sum of real per capita incomes.

Under the Eleventh Five-Year Plan it is planned to accelerate the growth rates of labor productivity in industry, construction and agriculture by approximately one-third. In public production labor productivity will increase by 18 percent, which will make it possible, according to calculations, to

save the labor of approximately 17 million workers a year as against 15 million under the Tenth Five-Year Plan and to raise the average monthly earnings of workers and employees by 14.5 percent and the real per capita income of the population--by 16.5 percent. As a result of a one-percent increase in the productivity of public labor there will be the following increase in indicators (percent):

	1976-1980	1981-1985 (plan)
average earnings of workers and employees	0.93	0.81
real per capita incomes	1.06	0.93

One should take into account the fact that each percentage point of increase in real income under the current five-year plan will mean in practice that the families of the workers will have at their disposal a 5.8-fold increase in various kinds of material goods and services as compared to prewar years. The average monthly earnings of workers and employees in the national economy should increase from 168.9 rubles in 1980 to more than 193 rubles in 1985. Consequently, in the last year of the current five-year plan on a yearly average each worker and employee will receive income from labor of 290 rubles more than in 1980.

In order to solve the economic and social problems of forthcoming years, a course has been taken toward differentiated growth of wages for various categories of workers, branches and regions of the country. For example, it is intended to provide for more rapid rates of increase in wages of kolkhoz workers as compared to other public farms--20 percent. While in 1965 the income for each member of a kolkhoz worker's family amounted to 75 percent of the incomes of workers and employees, in 1980 it will amount to 89 percent. Under the Eleventh Five-Year Plan it is intended to bring the incomes of these two groups of the population closer together. With the help of differentiated growth of wages, the standard of living of various categories of workers in various regions of the country will also be more uniform.

Additionally, one must emphasize once again that the increase in incomes for all categories of workers, branches and regions of the country must be coordinated with the results of labor and its increased productivity. The basis for increasing the wages of various workers, including low-paid ones, is primarily increasing their labor contribution, reducing manual, less skilled labor, increasing their skills and achieving greater production results. In all cases wages should be earned.

State Regulation

Increased effectiveness of wages is predetermined largely by improvement of state control of them, that is, improvement of the system of planning funds for wages and consistent improvement of the organization of wages and all of its elements.

A higher level of planning is directly related to consistent introduction and systematic improvement of the normative method of determining the funds for wages. Beginning with the 1981 plan, this method was applied in 18 industrial ministries, and in 1982--22 of them. The main positive effect of the normative method consists in the direct dependency of the amounts of the wage fund on the increased volume of production and its increased effectiveness. Thus the enterprise is guaranteed a large amount of funds for wages when it expands the output of products and economizes on labor and material resources, and the state receives the necessary accumulations because of the planned annual reduction of the amounts of normatives, taking into account the assignments for increasing labor productivity.

The effectiveness of the normative method of planning depends on the degree to which the amounts of normatives reflect the application of progressive, technically substantiated norms, the degree to which they take into account assignments for reducing the labor-intensiveness of products, and the degree to which they account for the specific features of production in the branch. For example, taking into account the labor-intensiveness and the conditions of the work that is performed, the normative of expenditure of wages per ruble of output in the coal industry is considerably higher than in branches of machine building, and in the pulp and paper industry it is considerably higher than for enterprises of the chemical and petrochemical industry, and so forth.

There is no doubt that the application of the normative method of planning in and of itself will not produce the necessary national economic effect if systematic work is not conducted simultaneously to determine the normatives themselves more precisely, to provide for their stability, and so forth. It is also necessary to increase the motivation of the enterprises to reduce the material-intensiveness of production.

It is difficult to overestimate the significance of centrally implemented statewide measures in the area of wages. As was pointed out at the 26th CPSU Congress, "every such measure is a real stride in the direction that is important to us--to make the life of the Soviet people better."* Their effectiveness depends on a scientifically substantiated approach to determining new wage conditions and also active work at enterprises, in associations and in the branches for improving the organization of labor and production, improving the quality of norm setting, and seeking out and putting into operation reserves for increasing labor productivity. Considerable amounts of money are expended from the state budget on centralized measures for improving material well-being: during the 1960's--16.5 billion rubles, during the 1970's--32 billion, and during the Eleventh Five-Year Plan (planned)--16 billion rubles, including for measures to increase and improve wages--12.8, 22.5 and approximately 10 billion rubles, respectively.

*"Materialy XXVI s"yezda KPSS" [Materials of the 26th CPSU Congress], Moscow, Politizdat, 1981, p 35.

The largest measure to be conducted in forthcoming years will be gradually increasing the amounts of wages to 80 rubles a month and increasing wage rates and salaries of workers and employees, primarily in production branches of the national economy. The introduction of new wage conditions will make it possible to increase the stimulating role of wages in order to advance the skills of workers. It is becoming possible to provide additional advantages in payment for labor that is carried out in areas with unfavorable conditions and in intensive jobs, and to provide for more correct interbranch and rayon differences in payment. Prerequisites are being created for improving the quality of norm setting for labor, which directly and indirectly influences its increased productivity. Finally, improvement of the wage rate system makes it possible to apply more substantiated and effective systems of awarding bonuses, to coordinate bonuses with the results of labor, and not to regard them as a mechanical increment to wages.

Centralized measures should contribute to increasing labor productivity. It is necessary for wage increases at the time they are made to reflect achievements in work. This can be achieved if when introducing new wage conditions one utilizes reserves for increasing labor productivity in the associations, enterprises, organizations and branches.

At the beginning of 1982 new wage conditions were introduced for workers of the coal industry and mine construction in such large basins as the Donets, Kuznetsk, Karaganda, Ekibastuz and Pechora. The amounts of wage rates and salaries were significantly increased here. For example, for workers in underground jobs--by an average of 27 percent, in open pit work--by 23-24 percent, and in the remaining jobs--by 18-20 percent. In addition to this, the condition of the organization and norm setting for labor is being improved, aggregate output norms are being introduced, the workers are being more motivated to utilize mining equipment more completely with a fewer number of personnel, the adoption and fulfillment of difficult planning assignments is being stimulated, and so forth. Moreover, despite the complexity and difficulty of work in the mining industry, no less than one-fifth of the funds necessary for introducing new wage conditions come from reserves for increasing labor productivity and economizing on the wage fund.

One of the leading areas for improvement of wages is regional regulation of them. As was noted at the 26th CPSU Congress, "people still frequently prefer to go from the north to the south and from the east to the west, even though efficient distribution of productive forces requires movement in the reverse directions." In order to equalize social conditions in various regions of the country, in addition to wages, it is important to develop housing, socio-cultural and domestic construction. At the same time it is clearly not justified to ignore wages as a means of attracting and retaining personnel in rapidly developing regions of the country. As a rule, it is precisely in these regions that new wage conditions are introduced first, they include various benefits for additional vacations, and so forth. But the main stimulus for providing the necessary personnel for enterprises and construction projects is rayon coefficients and increments for work tenure. All other conditions being equal, they make it possible to increase the wages of workers and employees from 15 to 100 percent as compared to the central, southern and western regions of the country.

Taking into account the measures earmarked for the Eleventh Five-Year Plan and those previously conducted, regional coefficients will be introduced for all workers and employees in the north and east of the country, including the Urals, part of Kazakhstan, and the north of Vologda and Kirov oblasts.

An effective means of creating stable labor collectives in the eastern and northern parts of the USSR will be increments related to the length of service in an association, enterprise or organization. These increments will be introduced first in regions of the Far North and locations on an equal footing with them, then in the European North, and under the Eleventh Five-Year Plan it is planned to establish them in the southern regions of the Far East and Eastern Siberia.

The policy for calculation and the maximum amounts of the increments are differentiated for these various regions--in the Far North they can amount to 80 and even 100 percent of the earnings (not including regional coefficients and certain other payments) and in regions of the European North--30 percent. In all cases there will be greater motivation to work not only in a given region, but also in a given association, enterprise or organization.

When problems of improving rayon regulation of wages are being considered a suggestion is frequently made to unify the coefficients that are applied in a given region. As a rule, this means increasing all the coefficients to the maximum level envisioned for individual enterprises or branches in the corresponding region. Obviously it would be expedient to do a certain amount of work here. But one should take into account that the advantages in the amounts of the coefficient in the majority of cases are established deliberately taking into account the national economic significance of one project or another. For example, they are speaking about advantages that were introduced for construction workers of the BAM, the operation workers of the deposits of the Tyumen petroleum complex, the Southern Yakutsk coal basin, and so forth. It would hardly be expedient to eliminate these benefits.

Still, in a number of cases, instead of systematic work for improving conditions and organization of labor and giving the most serious attention to housing and domestic construction, unsubstantiated subsidies are provided for introducing or increasing the amounts of coefficients and other benefits. Certain executives obviously think that wage benefits in and of themselves will make it possible to enlist and retain personnel. These benefits, obviously, cannot compensate for unsatisfactory working conditions, housing and cultural-domestic conditions, and so forth. Moreover there is no doubt about the lack of coordination in wages with all the unfavorable consequences that ensue therefrom.

Sometimes suggestions are made about extending remunerations for length of service to all or the majority of branches of the national economy, and making wages rigidly dependent on the work tenure. It is necessary to take into account first of all that wages in all cases should be determined by the results of labor and work indicators. With an equally conscientious attitude toward labor, work tenure will undoubtedly be reflected in these indicators, but in and of itself it does not determine them. It is possible to achieve

high results from work with a short length of service. If remuneration for length of service were provided for everyone, the advantages for the most important branches and kinds of work would be eliminated.

Certain measures are also being taken to increase the coefficient of shift work. For example, the amounts of additional earnings for working at night are being increased. Under the Eleventh Five-Year Plan new steps are envisioned for this area. As practice shows, it is especially effective to increase the additional payment for nighttime work in combination with free food and other benefits. Other measures will apparently be needed in this area in the future.

The Effectiveness of Forms and Systems of Payment

Increased effectiveness of piece-rate and time-rate forms of payment is predetermined by the quality of norm setting and the application of effective systems of incentives, taking into account the peculiarities of the work that is performed. Additionally, their further development could lead in the future to the introduction of combined piece-rate--time-rate payment, that includes the advantages of both forms. In this connection one should take note of the system of organization and payment for labor that is applied in highly mechanized productions that operate according to the VAZ method. Although the payment in effect at the VAZ is time-rate, it is based on taut norms of labor expenditures and it effectively stimulates consistent reduction of the labor-intensiveness of production, the fulfillment of the established norm assignments and a high level of labor productivity and product quality.

While previously bonuses were awarded mainly to workers with time-rate payment for labor, under the Ninth and Tenth Five-Year Plans they were extensively awarded to piece-rate workers as well. In industry now out of every 100 piece-rate workers or time-rate workers, more than 90 are included in the bonus system. At the same time there has been an essential increase in the proportion of bonuses in the wages of all categories of workers. Consequently, with further improvement of the system of bonuses special attention should be concentrated not so much on the quantitative as on the qualitative aspect of the matter--improving indicators and conditions for awarding bonuses, strengthening their connection with basic achievements in work and, above all, with indicators of increasing labor productivity and economizing on material expenditures.

Beginning in 1982 there have been more bonuses for workers, masters, technologists, designers and other specialists for economizing on material resources as compared to the established norms for expenditure. Moreover the amounts of the bonuses are made directly dependent on the sum of actual savings obtained, taking into account the kind, value and degree of shortage of the material resources that are saved.

The application of other kinds of payments of an incentive nature, various kinds of additional payments and increments have already been made dependent on the effect that is obtained. Thus increments to wage rates and salaries,

high qualifications, professional mastery and also combining professions and expanding the service zones as well as performing the established volume of work with a smaller number of personnel (incidentally, recently both have expanded significantly) are calculated from savings on the wage fund obtained as compared to the normative established for it or the planned fund.

In order to stimulate hard work, a differentiated system of rates is also used. For example, in order to increase the motivation of the workers to develop servicing of many machine tools (many sets of them), the piece rates when changing over to servicing machine tools, machines and sets of equipment in excess of the branch norms can remain unchanged, even in their full amount.

In machine building and metal processing as well as other branches rates are ever more extensively being increased by up to 20 percent for work under progressive technically substantiated norms. It is important to differentiate their amounts on the basis of the complexity, responsibility and intensiveness of the work that is done. In all cases the increase should be less than the earmarked increase in output norms (reduction of time norms) in order to provide for more rapid rates of growth of labor productivity. For example, the introduction of increased rates at plants for repairing agricultural equipment in the Kazakh SSR makes it possible, as a result of a revision of norms, to reduce the labor-intensiveness of the repair of the main kinds of tractors, combines, trucks and their engines by 17 percent, while piece rates are increasing by an average of 13 percent.

The quality of norm setting for labor depends largely on prompt and high-quality revision of the norms. Here one uses a special system of additional payments or one-time remunerations for workers whose norms are revised. Initiators are given preferential incentives. The source of these payments is part of the savings obtained from reducing labor-intensiveness when the norms are revised.

As the experience of Uralmashzavod, the Novokramatorsk machine building plant, the Kaluga turbine plant, and the Novosibirsk, Krasnoyarsk and many other associations and enterprises shows, a large role in increasing the efficiency and quality of work is played by brigade forms of organization and stimulation of labor. Here one should speak not about mechanical joining together of the workers into brigades, but about effective and comprehensive utilization of the great possibilities of increasing the effectiveness of labor on the basis of collective organization and payment. Unfortunately, of the overall number of workers combined into brigades, only half and, in a number of cases, even less are in brigades with payment under a single contract.

The application of coefficients of labor participation is very important for self-administration of the brigades and strengthening of the effectiveness of payment for labor. There is no doubt that the coefficients of labor participation in and of itself still does not provide for increased effectiveness, and frequently the distribution of the overall earnings is quite justifiably made dependent on the wage rate category of the workers and the time they

have worked (especially when the job corresponds to the category of the worker). But it is also obvious that the coefficient of labor participation can reflect more precisely the results of the labor of each individual, including combining jobs, training backward workers, and so forth. It is hardly expedient to strictly regulate the amounts of the coefficients of labor participation, keeping in mind the purpose and policy for establishing them. Yet branch recommendations which determine the main principles and the starting points for the application of coefficients of labor participation could apparently play an important role.

Under the Eleventh Five-Year Plan, which is characterized by the assimilation of intensive paths of management, many undertakings in the area of improving control of wages will be tested. The system of controlling them under subsequent five-year plans will be planned on the basis of this.

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PRODUCTION ASSOCIATIONS MUST INCREASE ROLE IN PLANNING, RESOURCE ALLOCATION,
FINANCING & FOREIGN TRADE

Novosibirsk EKO: EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA in
Russian No 3, Mar 83 (signed to press 26 Jan 83) pp 15-37

[Article by Yu. V. Subotskiy, doctor of economic sciences, professor, Institute of Economics of the USSR Academy of Sciences (Moscow): "How to Utilize Advantages?"]

[Text] In keeping with the decisions of the party and government, a large amount of work is being done to improve the administration of industry. Acceleration of the processes of concentration and specialization of production, expansion of the field of economic maneuvering, reduction of the time periods for scientific and technical innovations to proceed from the laboratory to the plant shops, reduction of the number of units of administration, and increased local initiative--including these and other factors of intensive management involve associations to a significant degree.

The widespread process of creating associations in our country was preceded by a decade of experiments. Their results are reflected in the well-known decree of the CPSU Central Committee and the USSR Council of Ministers of 2 March 1973, "On Several Measures for Further Improving Administration of Industry," after which the formation of associations was developed on a large scale. This period came at the end of the Ninth and the beginning and middle of the Tenth Five-Year Plans.

And now we are in the final stage--the process of forming associations is being completed. As was written in the "Basic Directions for the Economic and Social Development of the USSR During 1981-1985 and the Period up to 1990," in the next few years it will be necessary to refine the general schemes for administration developed in industry with respect to the tasks of the Eleventh Five-Year Plan. A task has been set to improve organizational structures in a planned way and to increase the efficiency of the operation of production and industrial associations on the basis of further concentration, specialization and cooperation.

EKO has repeatedly included on its pages material about the work of associations. Most of this was an analysis of the constituents of success. We have written about "Electric Power" (1982, No 7) and "ZIL" (1982, No 10), and we

have discussed the condition of the problem of assimilating the VAZ experiment (1981, No 8). We have also written about the process as a whole. The last publication of this kind was in 1979, No 8 ("The Association: Paths of Development").

The article presented for the readers' attention by Yu. V. Subotskiy analyzes the experience in operating associations and considers ways of further developing them.

Problems peculiar to associations are only part, although an important one, of a more general problem of improving the organizational structure of industry. This includes, in particular, the task of increasing the effectiveness of the operation of small enterprises (they were discussed in No 9 for 1979). Not absolutely all enterprises, obviously, should be included in associations, but each of them should operate efficiently and have the necessary conditions for this.

This issue is touched upon in the article by S. A. Yuzepchuk, which is devoted to the condition of work with general systems for administration in branches and reserves for improving the organizational structure of industry.

At the November (1981) Plenum of the CPSU Central Committee it was said: It is well known that the main production units under our conditions are enterprises and associations. This means that all administrative agencies and the entire economic mechanism are called upon to contribute to their better operation."

As of 1 January 1982 there were 44,606 such basic units in industry, including 4,144 production and scientific production associations; 7,766 enterprises under the jurisdiction of these associations and maintaining independent books; and 32,696 enterprises that were not included in associations. About 80 percent of the industrial enterprises were on independent books. The associations embraced 35.4 percent of the production units in industry. The number of economically independent units in industry is 11.4 percent less than it would be without associations. Associations account for 47.9 percent of the volume of sold products and 50.3 percent of the number of personnel.

Production associations have undoubted advantages and complete utilization of these is an important condition for increasing the efficiency of production.

The Stage of Qualitative Development

In keeping with the decree of the CPSU Central Committee and the USSR Council of Ministers concerning improvement of the economic mechanism (1979), under the current five-year plan it will be necessary to complete the formation of production associations as the main khozraset unit of industry. Today, in essence, we are completing the initial, "institutional" stage of the development of associations, which is typified primarily by restructuring of the organizational and economic structure and searching for efficient forms of it.

During the two decades that have passed since the formation of the first associations their advantages have been confirmed by the work experience of ZIL, VAZ, LOMO, Elektrosila, Uralmash, the Minsk tractor plant imeni V. I. Lenin and many others. But today the majority of associations do not have the most rapid growth rates in their branches. The economic results of many of them are not high. Unfortunately, the creation of new units as a whole has not changed the tendency toward reduction of the rates of increase in labor productivity and the level of output-capital ratio in industry.

It seems to us that there are two main reasons for this. The first is that the formation of some of the associations has been reduced to an administrative restructuring and has not been accompanied by progressive changes in the organization of production in keeping with the requirements of modern scientific and technical progress. The second is the incomplete utilization of the possibilities of khozraschet organization of associations, which involves the fact that they have operated and are operating under the conditions of an economic mechanism which was arranged in keeping with the possibilities of a single enterprise. Inherent in enterprises is a narrower framework of autonomous financing and a large number of centrally determined indicators of activity, and this means also being subject to the influence of an extreme number of factors that do not depend on them. The effect of these factors do not necessarily involve either incentives or sanctions for the economic units.

Associations inherently have more complete autonomous financing, greater material motivation and greater responsibility. Therefore the task of utilizing the advantages of associations corresponds to a greater degree with the task of improving the economic mechanism.

A distinguishing feature of the forthcoming stage is the development of a process not only and not so much in terms of breadth as in terms of depth. The tasks consist primarily in qualitative improvement of the associations that have been created. It will be necessary to overcome the formal nature of some of these units, to eliminate mistakes during their creation, to refine the composition, to consolidate or break down some of them, and to provide for a high level of their production and economic organization.

Associations that are formed perfunctorily, without the necessary conditions, are, as a rule, plants that produce various kinds of products that are not related by cooperation and, moreover, are territorially removed from one another. The creation of these associations has not led to concentration of production and at the same time has narrowed the zone of service of many enterprises to the framework of the associations, deprived certain plants and factories of flexibility, and reduced their adaptability to the changing interests of the consumers.

Many plants have been deprived of their khozraschet independence even though the conditions for including them closely in intrafirm cooperation did not exist. This has reduced their role in the economic mechanism and weakened their initiative and responsibility for satisfying the demand, selling products, reproducing funds and utilizing resources.

The association of the Balakhna pulp and paper combine and Cardboard Factory imeni M. I. Kalinin can serve as an example of mechanical formation of a complex. These enterprises do not have stable cooperation, they are territorially separated and moreover there is not only no railroad between them, but they do not even have direct telephone communications. The creation of the association deteriorates the conditions for management and control of production, complicated supply and brought about an increase in the number of administrative personnel. The economic indicators of the enterprises dropped.

The consequences of artificial formation of associations are eliminated in various ways, with greater or lesser decisiveness, and most frequently not comprehensively.

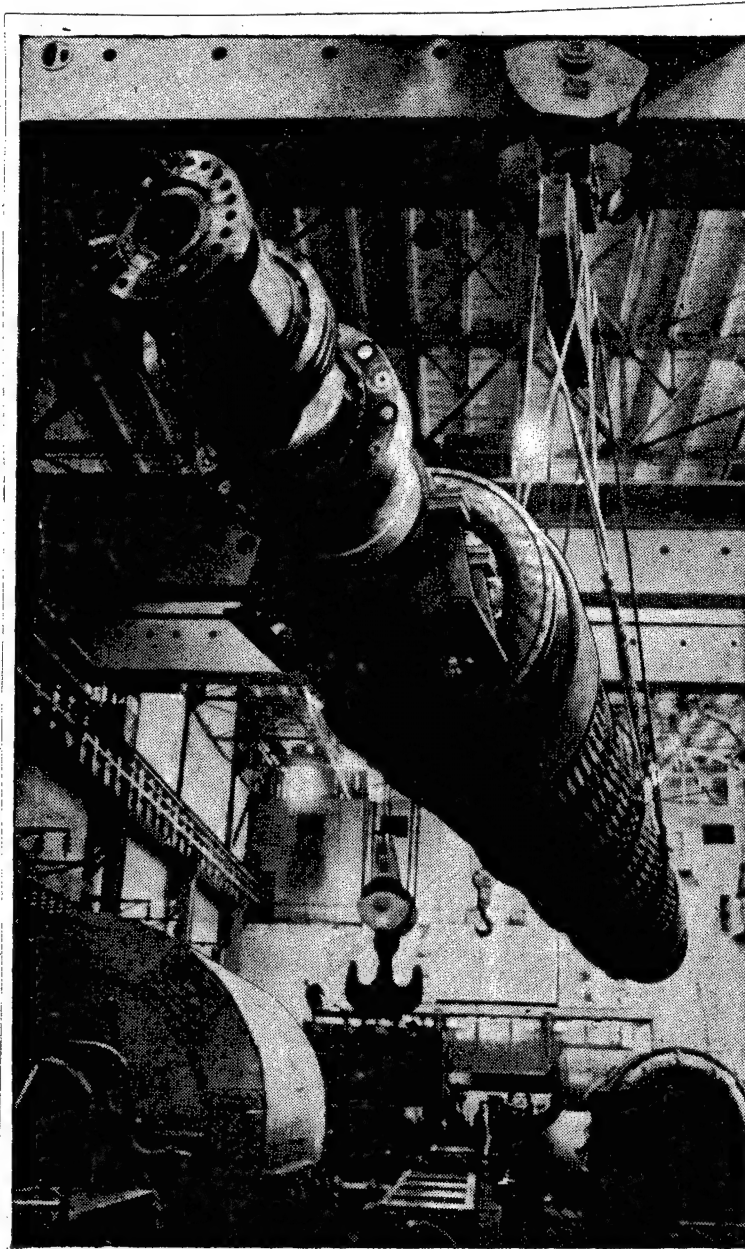
One of the clear tendencies of recent years is the restoration of the rights of a corporate body to enterprises that produce final products and are directly related to suppliers and consumers. Depriving the enterprises of these rights has been justified in branches with developed interplant cooperation. But in places where plants and factories inherently have object specialization, they are territorially dispersed and there is no objective possibility of the appearance of production ties, the expediency of this measure is considerably less. Therefore it should be applied in a differentiated way, taking into account the specific conditions. But in fact it has been applied to almost every other enterprise included in associations. This practice is now being corrected. Thus in 1979-1981 complete autonomous financing was returned to more than 100 branches of timber industry associations and the same number of coal mines. Suggestions concerning restoring the rights of a corporate body are constantly being made by associations of a number of other branches.

It is necessary to correct the mistakes made during the creation of associations by improving their organization--changing the composition, developing specialization and cooperation, and adjusting the system of internal autonomous financing and administration. And associations that have been created in spite of the absence of the necessary conditions must be broken down--they are clearly less expedient than khozraschet enterprises which have economic independence and are economically responsible for the fulfillment of the planned assignments.

There is a persistent need to enrich the forms of organization of associations and to give them greater diversity. In addition to branch associations it is necessary to have associations of different branches which integrate production with various forms of preparation for it, sale of products and service for the consumers (production-installation, industrial-batching, industrial-trade, training-production, production-procurement and so forth). It would be expedient to create complexes of auxiliary productions--repair, repair-construction, instrument and so forth that perform deliveries and work for enterprises of the region, regardless of their branch jurisdiction.

It is necessary to have not only "multiplant" associations, but also "multi-complex" (multi-echelon) ones which consist of profiled production or

scientific production complexes (echelons, divisions)--groups of enterprises and design bureaus that are specialized in terms of objects or technologies and operate with internal khozraschet.



ЛЕНИНГРАДСКОЕ ПРОИЗВОДСТВЕННОЕ ОБЪЕДИНЕНИЕ «ЭЛЕКТРОСИЛА». СБОРКА РОТОРА ТУРБОГЕНЕРАТОРА МОЩНОСТЬЮ 800 ТЫС. КИЛОВАТТ ДЛЯ ИГНАЛИНСКОЙ АЭС.

ФОТО ТАСС

Leningrad production association Elektrosila. Assembly of rotor of turbo-generator with capacity of 800,000 kilowatts for Ignalinskaya AES.

In addition to associations that are unified economic units, on the agenda is the organization of contractual associations--unions on a share basis. Their goal is to coordinate the activity of industries of various branches, to provide for stable specialization and cooperation of plants, and to organize and operate joint enterprises. Contractual associations could create general services, auxiliary industries and warehouse bases, combine investment funds, plan the work of joint enterprises, distribute their profit and make payments into the budget.

Let us consider in greater detail the two aforementioned problems--developing the organization of production in associations and increasing their role in the economic mechanism.

Associations and the Organization of Production

There is no reason to consolidate economic facilities unless this involves progressive changes in productive forces and production organization or the existence of material prerequisites for this. If such profound changes are not achieved or are not objectively to be achieved, which means that the consolidated economic form does not have the necessary technical base, it cannot provide effectiveness or increase it, or realize the advantages of consolidated production.

An essential feature of concentration of production is its organic combination with specialization. The possibility of achieving this combination within the framework of associations is one of its most important advantages. Society needs not just any concentration, but the kind which appreciably increases economic effectiveness. Consolidation of production and the specialization which it involves meets this requirement to the greatest degree. Hence, in particular, it follows that it is not enough to characterize the development of the branches by referring to the proportion of associations in the overall production volume. This is a description not of the production, but of the economic structure of the branch. It is necessary to have indicators that reflect the dynamics not only of the production volume of associations, but also cooperation within these complexes.

So far the condition of specialization in industry has not changed in any appreciable way. Analysis of data shows that the proportion of the effect from specialization and concentration of production involved with associations is less than from other factors, primarily from the reduction of the administrative staff. Thus in light industry savings from improving production organization in associations amounted to only 41 percent of the total effect obtained as a result of their creation. The data in Table 1 are also indicative. Production cooperation in associations practically did not expand under the Tenth Five-Year Plan.

There are several factors that explain this situation. First of all, in various branches there is an appreciable difference in the degrees of readiness of the technical base and production organization for the formation of associations with a high level of specialization. In some of them the creation of associations is a predictable "formulation" of a higher level of

specialization and cooperation, a recognition of developed organization of production that has already been achieved. In others this is evidence of certain material prerequisites for this. But the most typical situation is one in which the creation of the association does not complete high development of specialization and cooperation but, on the contrary, is called upon to contribute to it. Modern associations grow mainly not because of the level of production organization that has been achieved, but out of a need to raise it, primarily on the basis of regrouping existing production factors. Such conditions, naturally, postpone obtaining a considerable additional effect.

The second group of factors amount to insufficiently rational formation of associations, which impedes the development of specialization. For example, the sewing association in Transcarpathia included only enterprises of the oblast. Various kinds of sewing factories do not make it possible to arrange cooperation among them or to develop concentration and specialization of production. Apparently it was necessary to combine factories of the same kind from neighboring oblasts. But now these factories retain the same closed structure determined by objects, which is the least effective.

Improvement of production organization in many associations is limited to their small sizes. Some of them consists of one plant or design bureau. In the chemical and gas industry, petrochemical, heavy and energy machine building, machine tool building and instrument building there are many associations that consist of two plants. In tractor and agricultural machine building many of them include 2-3 units. Complexes consisting of three plants are typical of ferrous and nonferrous metallurgy, machine building for light and the food industry, and also the electrical equipment industry. In light industry a number of associations includes two plants each. Such are Kaluzhanka (Kaluga), Raduga, Sokol and Salyut (Moscow), Voskhod (Smolensk), Volna, Tribuna and Bol'shevichka (Leningrad), Krasnaya Zvezda (Kuybyshev) and others. Approximately only every sixth association has its own scientific and technical base.

Among the difficulties standing on the path to consolidating these complexes is the unsubstantiated departmental decentralization of certain productions and their dispersion. Is it possible to create large associations for manufacturing reinforced concrete items if, for instance, in Sverdlovsk Oblast they are produced by 43 plants under the jurisdiction of 15 ministries? The increased number of small departmental contracting organizations certainly does not contribute to the formation of large construction associations. With the forthcoming refinement of general systems of administration of the branches one should take measures for efficient concentration of enterprises and industries in profiled economic systems. The time is quite right for this task--the composition of enterprises of the industrial ministries has not been revised since 1965.

The formation of associations of efficient sizes is impeded by the lack of a methodology and methods for determining these sizes. The problem cannot be solved by grouping existing enterprises and discovering the size with the best results as is done for unit enterprises. These results are usually predetermined not by the scale of the complex, but by other factors, primarily

the sizes of the plants and factories that are joined together and the level of their capital availability. In a group of large associations then there can be one with a large number of small units, and also complexes essentially cannot characterize the results of large-scale production.

The initial basis for determining efficient sizes, as it follows from the goals of creating associations, should be the need for division and cooperation of labor, and concentration of production on the basis of the utilization of scientific and technical achievements. Therefore the methodology for forming associations can be represented as the imposition of a unified economic form on the complexes of production ties that are most advantageous from national economic standpoints. Naturally, it is also necessary to take into account requirements for an efficient economic structure of the branch, including conditions for applying khozraschet. The creation of extremely large enterprises is fraught with a weakening of khozraschet responsibility of the plants to the consumers (purchasers) and banks, as well as deterioration of the conditions for revealing both local and socially necessary expenditures and for the development of socialist competition among manufacturers of products of the same kind.

Table 1. Dynamics of Level of Cooperation (Proportion of Internal Circulation in Volume of Gross Output) in a Number of Associations of the USSR Ministry of the Electrical Equipment Industry, %*

Production associations	Year of creation	Level of cooperation		
		1976	1978	1980
Moskabel'	1974	10.4	9.83	10.2
El'fa	1967	2.32	2.34	2.28
Zaporozhtransformator	1971	8.74	8.29	8.1
Zakavkazkabel'	1974	5.37	5.38	5.42
Dinamo	1974	2.77	2.81	2.88

*Chernyshev, B. N., "Organizatsionnyye osnovy razvitiya proizvodstvennykh ob'yedineniy v otraslyakh promyshlennosti" [Organizational Bases for the Development of Production Associations in Branches of Industry], Moscow, 1982, p 17.

The increase in the sizes of the units should not make them more difficult to control. Finally, one should pay attention to the social aspects--providing for an efficient system of settlement, full employment of the population of small cities, the creation of conditions for highly productive labor at branch plants, and so forth.

Analysis frequently does not show the direct dependency between the sizes of associations and the efficiency of production. This means that their formation has been reduced to economic centralization and has not brought progress in concentration and specialization of production. Having studied this issue in the sewing industry, I. I. Fastovskiy has established that in associations of this branch labor productivity depends on the sizes of the subdivisions--the flows of sewing factories--to less a degree than on the sizes of

the associations themselves (Table 2). In particular, such small associations as the Kiev Kashtan and the Nikolayev association imeni S. M. Kirov whose flows, however, were twice as large as those of the large associations Ukraina and the Vinnitsa association imeni V. V. Volodarskiy, have better indicators.*

Table 2. Dependency of Product Output per 1 Worker on the Volume of Products Produced and the Dimensions of the Flows in Associations of the Sewing Industry, in Rubles of Normative Value Output NSO-73

Groups of associations in terms of volumes of products produced, millions of rubles	Output of products per 1 worker, rubles	Groups of associations in terms of sizes of flows, millions of rubles	Output of products per 1 worker, rubles
		0.384-0.440	1,592
3.1- 9.3	1,702	0.440-0.493	1,612
9.3-15.5	1,623	0.493-0.546	1,763
15.5-21.7	1,477	0.546-0.597	1,609
21.7-27.9	1,870	0.597-0.652	1,629
27.9-34.1	1,551	0.811-0.864	2,137

But it does not follow from this that the sizes of associations do not influence the efficiency of production. The same author notes that "when creating associations, as a result of the technological specialization of the factories that are included in them, conditions appear for the organization of flows of an efficient capacity in all stages of production." The sizes of the parts and the whole are mutually interdependent. When they are coordinated the capacities of the technological divisions have a certain amount of significance for establishing the sizes of the plants and factories that are joined together and of the association as a whole, and the production capacity of any subdivision should be no less than the minimum allowable, that is, it should provide for proportional calculated expenditures at a level no higher than the average branch expenditures.

Strengthening real concentration of production in associations is impeded by small subdivisions whose role is self-support with products of various kinds. This strong tendency is nourished by the desire to minimize supply ties. It is not especially difficult for associations to form new industries from shops of existing enterprises and provide them with energy, heat and service. This is precisely the way many enterprises eliminate the lack of coordination among assembly, mechanics and procurement productions and eliminate the shortage of certain resources. Organizationally this path is relatively simple and reliable, but it is not very effective on the scale of the society. In essence it means the formation of a special autonomous organization of production within the framework of the corresponding associations without

*Fastovskiy, I. I., "Ratsional'naya organizatsiya proizvodstvennykh ob'yedineniy v shveytnoy promyshlennosti" [Efficient Organization of Production Associations in the Sewing Industry], Kiev, 1979, p 8; pp 10-12.

optimization of the influence of the center and frequently in violation of the requirements for an efficient structure of intrabranh and interbranch ties.

Certain preplanning and design developments can give an idea of the scale of "self-support" which can arise in associations in the future. Thus in tractor building associations it is proposed to introduce: in Minsk--a repair and machine plant, in Chelyabinsk--a smelting and repair and machine plant, in Kharkov, Altay and the Kievtraktordetal'--plants for special instruments and technological fittings and a repair and machine plant. It seems that it would be more expedient to have centralized regional support for tractor plants and enterprises of other branches.

One of the reasons for the decreased effectiveness in the associations is the fact that the plants and their shops which are joined together and produce components, parts and semimanufactured products are reoriented toward only the needs of their own association and ignore the interests of consumers from outside.

The Spetsstanok plant which became part of the Zavod imeni S. Ordzhonikidze machine tool building association was reoriented toward the output of hydraulic components for the head plant, and the production of its previous products--small grinding machines--was stopped, and the manufacture of this machine tool which the consumers needed was not transferred to another enterprise. Among the consequences of such phenomena is a reduction of the level of standardization of elements of products in the branch since these elements, by becoming individual in nature, forfeit their branch significance.

Under the conditions of extensive creation of associations which absorb a considerable proportion of existing plants and in the future will absorb new plants and base shops specializing in parts, components and technological equipment, the tendency toward reorienting them to serve only "their own" association requires constant attention. It should be counteracted by centralized formation of an efficient production structure of the branches and regions, expansion of the standardization of parts on a branch and interbranch scale, and more active stimulation of deliveries of elements of products, including spare parts, to outside consumers.

Progress in the organization of production cannot be the result of the act of creating associations alone. It involves a restructuring of the existing system of interbranch ties and requires increased control of processes of public division and cooperation of labor. Now the main planning documents that determine the organization of the associations are branch general plans of administration which reflect mainly conditions and needs for the initial creation of these units and resolve mainly administrative issues. And measures for specialization and cooperation in production within the associations are not envisioned either in the general plans for administration or in the branch plans. It seems that these measures should be determined within the framework of considerably more complete and developed national economic and branch planning of the organization of production than is now the case.

Associations and the Economic Mechanism

As we know, in economic activity two kinds of resources are used: centralized and khozraschet. This is natural and predictable. But one cannot but take into account that if the effectiveness of the latter is revealed and stimulated through khozraschet means, these means are applied to the former, centralized kinds within certain limits. Such resources are allotted to the unit free of charge, and they are not "earned" nor are they "worked off" by them. Since the proportion of these resources is significant, the growth and the increased efficiency of production are not sufficiently stimulated. Moreover, khozraschet of local units, with the existing organization, cannot create conditions for initiative in implementing relatively large-scale measures, primarily in such areas as the development of the technical base and the organization of production.

But this means that the associations cannot bear economic responsibility for passivity in a whole number of important areas and cannot be the centers of innovation. The opinion of G. A. Kulagin expressed a couple of years ago is still timely: today the director is essentially not responsible for the development of production . . . as for the renovation of equipment and new construction, everything is simple here: if they have given him the money he builds, if they have not, he throws up his arms and complains."*

The proportion and significance of those factors of management that depend on the higher agencies and do not depend on the initial units are extremely significant. And this leads to essential problems in the system of material incentives. It is not simple to discover who and which economic units bear real material responsibility for low levels of concentration and specialization of production, for inefficient cooperative ties, for excessively long-distance shipments and those that meet each other on route, for unjustified distribution of enterprises, for increased volumes of incomplete construction (in 1965-1980--from 69 to 80 percent of the annual volume of capital investments), for inefficient construction projects, or for the lack of adapted storehouses which leads to losses of the crops of grain, fruits and vegetables (during winter storage alone up to 25 percent of the potatoes, 20 percent of the sugar beets and 18 percent of the fruits spoil). It is not easy to say which structural units are directly motivated to prevent increased outlays and losses in these areas.

Since the reasons for extravagance in these cases frequently have nothing to do with the khozraschet units, inactivity or incorrect decisions do not entail economic responsibility, they are not always fully revealed, and the guilty parties and the consequences are forgiven. It turns out that inefficient activity involves "only" the interests of the national economy as a whole and are not sufficiently appreciable for the associations and enterprises. In essence, the functions for satisfying a whole number of socially valuable interests are not assigned to khozraschet units. An important requirement for organizing the economic mechanism has not been completely realized: any production and economic process should be clearly assigned to a

*EKO, 1975, No 2, p 94.

particular agent--the structural unit which has sufficient material incentives in the corresponding area and the appropriate potential.

The limitation of the functions of the primary units is another consequence. It is necessary to establish not reduced, but socially average normatives of wages for many units which have unutilized reserves for growth. This is inevitable if their realization requires centralized decisions and does not depend on the primary unit. For the latter the existence of unutilized reserves is an objective condition of operation and units cannot be blamed for it or bear responsibility. This is one of the reasons for the frequent cases where in associations with new equipment the payment for labor is no higher than in those where the equipment is obsolete. For in practice technical re-equipment is the responsibility of the planning center and one cannot hold the primary unit responsible for the excessive age of equipment because this is unfair. It turns out that when the role of the unit is reduced it is difficult to realize the requirements for payment for labor as well.

In practice it sometimes turns out that they try to make up for reduced stimuli, including less responsibility on the part of primary units, by expanding the composition of directly established indicators. But one cannot replace or augment the other. Weakened incentives and passivity at the primary level are among the reasons for the appearance of lax plans that increase the permissible volume of resources that are used and reduce the requirements for the return from resources that are utilized.

But the chain extends even further. Decreased results of initial units, being legitimized by the plan, assume the appearance of socially normal ones, and proportions that arise at random assume the form of planned proportions, and narrow departmental and local manifestations are legitimized. And all this is the consequence of weak khozraschet of primary units: unjustifiably extensive direct, "drawing board" redistribution of the funds of the enterprises without respect to the results of collective labor, its quantity or quality, and reimbursement for outlays and losses from the resources of the society, a kind of "collectivization of outlays and losses."

It is interesting that in spite of all this the enterprises do not have special limitations on funds. The consequences are diverse: they acquire costly and less effective technical equipment, the effective demand for resources increases, which leads to a shortage of them, the effectiveness of the price mechanism decreases, it loses its ability to hold expenditures down, and the regulating role of finances is weakened. In a word, autonomous financing does not fulfill the role of limiting wasteful expenditures.

Historical experience has repeatedly proved the inadmissibility of weakening the role of structural units. This circumstance was noted, for example, in the decree of the Presidium of the Supreme Council of the National Economy of 11 July 1921 (the document was edited by V. I. Lenin): "One of the main shortcomings of the present economic policy is the lack of an economic subject and, as a consequence of this, a lack of efficient administration of industry."*

*"Leninskiy sbornik" [Leninist Collection], XX, 1932, p 108.

In order to eliminate the aforementioned situations it is necessary to increase the role of large associations on the basis of the state plan--to expand their economic independence, and to reduce the number of factors that are out of their control, and thus broaden the framework of their responsibility. Associations can and should be responsible not only for implementing decisions, but also, to a considerably greater degree than individual enterprises, for adopting them. It seems that herein lies one of the decisive problems in the development of the economic mechanism.

Increasing the role of the main structural units can not be regarded only as some kind of organizational streamlining. This course reflects the objective and profound processes of socio-economic development. It should open up the broad expanse for the creative activity of the workers in public production. It is important for the control to be provided not only from the upper echelons of the hierarchy, but also by means of mechanisms that operate from below, at the primary structural level. We can control successfully, noted V. I. Lenin "by joining all the workers together with unbreakable chains of vital interests."*

Underestimation of the active role of primary units and one-sided orientation toward administrative forms and methods of management lead to negative consequences in the sphere of centralized management as well. Planning centers are overloaded by many kinds of functions, including operational ones, and they must take the initiative and solve an excessively broad group of problems which they are not capable of handling. There is excessive centralized mediation of a multitude of economic processes. The primary, lower units are regarded only as units for following orders, objects of management. Under these conditions there is an inevitable decrease in motivation and a dissolution of responsibility in the administrative system.

How To Increase the Role of Associations?

First of all, in our opinion, it is necessary to increase the effectiveness of stimulation, by strengthening motives to take advantage of independence effectively and be prepared to bear responsibility. It seems that in order to do this it is necessary to realize the suggestion concerning the link between material incentives, including bonuses, not with the fulfillment of the plan, but with the actually achieved level of effectiveness of production and quality of work. It would be expedient to test the formation of a consolidated wage fund for the primary units as the sums remaining when distributing the gross income after deducting payments into the budget, the formation of investment funds and other funds.

Among the urgent measures is to strengthen the dependency of wages on the actual conditions and results of the operation of associations, production units and each worker. It is necessary to overcome the organization of payment where in there is no clear cut link with the quantity and quality of

*Lenin, V. I. "Poln. sobr. soch." [Collected Works], Vol 35, p 287.

labor (payment of piece-rate workers--without respect to the quality of the output norms, and time-rate workers--regardless of the actual volume of work performed, "guaranteed" average wages, and so forth). At the same time it is important to create conditions for more active encouragement of advanced workers. The director should have the right to double the payment to those who do double work. It is expedient to refrain from excessive uniqueness in the organization of wages and the application of wage rates and salaries, and to expand the rights of associations to utilize the savings on the wage fund, particularly to establish increments for a large group of workers. Strengthening control, but not preliminary and current control, but subsequent control will help to protect against abuses and "shortcuts."

In the area of planning it is necessary to increase the role of primary units in the development of plans. It should begin from below and be based on orders from consumers and counterplans. It would be expedient to expand the functions of large supply-sales and trade (wholesale) associations and enterprises in the formation of the production plans for the manufacturers and in the products list and assortment for their production.

Certain changes are also needed in the system of planning indicators. It is necessary to gradually change over from indicators that determine methods of production (technology and so forth), elements of expenditures, the structure of production factors and intermediate results of operation (volume of products for internal needs and so forth) to indicators of final results that reflect the effectiveness of the utilization of production factors. This evolution will expand the responsibility of the unit and reduce the possibilities of shifting it to the planning center.

At the same time it is necessary to apply more actively such a planning instrument as economic normatives which reflect public demands for the utilization of resources and parameters for the formation of consumer funds. Normative methods of planning contribute to objectifying economic management and limiting subjective manifestations, equalizing conditions for the activity of groups of enterprises, harmonizing the interests of the national economy and local units, and expanding their economic independence and initiative.

It is necessary to improve the mechanism for forming the resources of the associations: to limit or halt the granting of resources free of charge, to consistently adhere to the principle of making reimbursement for the latter, and to apply payments for them more extensively. The sum of the centralized financial funds granted to the branch (subbranch) should not be free subsidies, but loans with interest. It is necessary to permit the enterprises to keep part of the savings from all kinds of resources at their own disposal.

It would be expedient to augment the functions of these units in the area of developing production and improving its technical base, having granted them greater opportunities to form investment funds as production effectiveness increases and net income grows, and also with credit. There is an appreciable need to expand the allotment of money for the development fund, to finance large measures from it, right down to partial reconstruction of the plants, and to combine other khozraschet investment funds of the association

with it. This measure would make it possible to narrow the group of factors that do not depend on the enterprise or association and increase its responsibility for the condition of production funds which is now dispersed among various levels of administration.

The proposed measure will also make it possible to more actively update the products list and the assortment of products. The associations will be able to respond more efficiently to the demands of the consumers and promptly fill "holes" in the assortment. Finally, conditions will be created for organizing small, narrowly specialized branches of associations in small cities.

Expansion of the investment functions of associations will require improving the conditions for the utilization of noncentralized funds: to reduce the withdrawal of them for conducting centrally financed measures, and to arrange material-technical and construction-assembly support. It would be expedient for work that is paid for with money from the development fund to be envisioned at all levels in individual plans that are drawn up in keeping with the proposals of the associations and are also paid for from individual accounts with the Stroybank or Gosbank.

Increasing the role of associations in the area of finances presupposes:

the development of khozraschet self-financing and, on the basis of this, increased possibilities for initiative on the part of the units;

curtailment of the practice of non-plan, intra-branch redistribution of funds;

expansion of the "convertability" of financial funds of the association and rejection of extremely rigid barriers among them (for example, granting the right to invest in social and cultural construction money that has been saved because of efficiency in capital repair).

In the sphere of circulation the consumer associations should have greater possibilities of selecting the manufacturers of products (it has already been determined that in the selection of direct ties it is necessary to take into account the suggestions of the consumers regarding this), to influence the formation of the production programs of the manufacturers, and to acquire the necessary resources through the wholesale network of supply and sales agencies without funds or orders. All this will help to change the position of the consumer associations in the economy so that their competition for the best suppliers will be replaced by a competition on the part of the suppliers for the best support of the consumers. The final thing on the agenda is increasing the role of associations in foreign trade. It is necessary to adhere more consistently to the principle: the one that increases exports acquires the right to additional imports.

It is necessary to have closer economic ties between combined plants and the territories on which they are located which, in particular, would increase the motivation of local agencies to create the best conditions for the activity of the plants. Thus it would be expedient for accounts with the budget

concerning profit to be kept non-centrally, according to the work results of each of them, but for the final interrelations between the association and the budget to be carried out centrally at the end of the year in terms of the results of the activity of the complex as a whole.

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SHORTCOMINGS, POTENTIAL OF INDUSTRIAL MASTER PLANS DISCUSSED

Novosibirsk EKO: EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA in Russian No 3, Mar 83 (signed to press 26 Jan 83) pp 38-47

[Article by S. A. Yuzepchuk, candidate of economic sciences, USSR Academy of the National Economy (Moscow): "Master Plants and Organization of Administration of Production"]

[Text] Of course, not all organizations are capable of taking on increased economic functions. Small associations that do not include research and design organizations and do not have conditions for the development of specialization and cooperation cannot be the centers of initiative, the active bearers of economic independence or the subjects of broad responsibility. But the only thing that follows from this is that the economic role of associations should be increased selectively and gradually, initially selecting the largest and most developed of them for this.

The main task of the master plan is to develop an overall concept of branch administration, taking the future into account. In particular, the master plans make it possible to transform coordinated traditional auxiliary productions (repair, instrument) into efficient, well-equipped specialized productions and to create in a planned way new service productions (in machine building, for example, for automation of loading and unloading work, assembly processes and so forth). In certain branches of machine building, in order to develop master plans specialized productions have been created whose goal is to solve problems of product quality. In construction, road and municipal machine building a scientific production association has been created for producing hydraulic means of controlling technical equipment, and so forth.

With the creation of associations the number of objects controlled by ministries, departments and all-union and republic industrial associations decreased by almost 14,000. In tractor and agricultural machine building the value of industrial production capital per one object of administration after the creation of associations increased by 48.5 percent, the number of industrial personnel--by 17.5 percent, and the money in the fund for the development of production--by 24.7 percent. All this creates prerequisites for more efficient utilization of resources and increased flexibility of control as a

result of a reduction of the number of units. For example, associations for producing motor vehicles are now controlled on the basis of a 2-unit system: ministry--association. Administration of associations is concentrated in the ministry staff.

Small plants that have entered into production associations have the opportunity of advancing. Systems for administration of combines are brought into line with their scale and technology. For example, the Borovich cotton fabric combine imeni Leninskiy Komsomol, the Minsk fine fabric combine and others have been reorganized into a production association. This has made it possible to expand the rights and increase the responsibilities of the managers and provided an opportunity to bring the administration in line with the scale and technology. In other branches of industry during the course of the development of master plans large specialized shops were reorganized. They were included in production associations with the rights of production units.

But the successes achieved during the course of the implementation of the master plans cannot be regarded as general. They rather demonstrate the correctness of the path that has been selected, the fact that a basis has been found for improving the organizational structure of industry.

Shortcomings and Possibilities of the Master Plan

Up to this point the master plans have been developed basically to include enterprises and organizations within the framework of the economic (not "pure") branch, and therefore their introduction has essentially exerted no influence on raising the level of branch specialization. Still, according to data of the USSR Gosplan, the labor productivity of workers at enterprises of "their own" ministries is an average of 20 percent higher than at "others'" ministries, and the proportion, say, of the Ministry of Construction, Road and Municipal Machine Building in the production of products assigned to it does not exceed 75 percent, the Ministry of the Machine Tool Industry--80-85 percent, and the Ministry of Instrument Building and the Ministry of Machine Building for the Light and the Food Industry--60 percent. The Ministry of Light Industry, when developing a master plan received . . . 5 enterprises from other departments, although about 5,500 more enterprises correspond to the profile of this ministry.

It is known that many associations have been created perfunctorily, without preliminary development of plans for their organization. Such associations are inefficient and some of them disintegrate after 2-3 years of functioning, as was the case, in particular, in tractor and agricultural machine building. Many small enterprises have been transformed on paper and unjustifiably given the status of associations. This could have been justified by the orientation to their future development, but time is passing and they continue to exist in their previous form. Only the signs have changed on the Moscow Tekhnergoprom association, the Dushanbe Vtorchermet, Yakutsknefteprom, Dagneft', Kirgizneft' and others.

On an average for USSR industry one association includes 5 independent enterprises and production units. But in certain ministries (for example, the

Ministry of Construction, Road and Municipal Machine Building and the Ministry of Heavy Industry) the associations actually consists of 2 enterprises and production units, and in the Ministry of Power Machine Building for 10 production associations there are only 12 independent enterprises.

A large number of production associations do not have their own scientific research or planning and design organizations. In the Ministry of Light Industry for 500 production associations there are only 3 scientific research structural units. In the Ministry of Ferrous Metallurgy for 76 production associations there is one scientific research institute.

It seems that it would be expedient to regulate the minimum number of plants and organizations to be included in associations (of course, not "on the average" but taking into account the specific features of the branch) and to categorize associations depending on their composition, nature and volume of activity.

Plans for the creation of production associations that are adopted during the development of master plans and also the course of their implementation require attentive analysis. Many ministries do not fulfill their plans. These include the Ministry of Agricultural Machine Building, Ministry of the Electrical Equipment Industry, the Ministry of Nonferrous Metallurgy, the Ministry of Machine Building for Light and the Food Industry, the Ministry of Instrument Building and others. Moreover, in a number of branches there are a considerable number of small enterprises with a low production level. In industry there are now 21,600 or 49 percent of the enterprises where the number of workers does not exceed 200. The largest number of small enterprises is concentrated in the USSR Ministry of the Food Industry--about 3,500, the USSR Ministry of the Meat and Dairy Industry--more than 2,000, the USSR Gosleskhoz--1,700, the USSR Ministry of Light Industry--about 500, and the USSR Ministry of the Fish Industry--about 350. In machine building there is a fairly large number of associations with fewer than 500 workers: about 20 percent in the Ministry of Instrument Building, 12 percent in the Ministry of Construction, Road and Municipal Machine Building and 50 percent in the Ministry of Power Machine Building. Of course not all of them should be included in associations, but still it is obvious that the general plan should in one way or another consider these enterprises and determine the prospects for their development as well as their organizational and administrative status.

A 2-unit system of administration should be introduced more energetically. Now even associations with the same type of scale and production organization are included in systems with various units. If, as already pointed out, all associations that produce automobiles were directly under the jurisdiction of their ministry, all associations for producing tractors would be included in a 3-unit system: ministry--all-union production association--production association. Explaining such a situation by branch peculiarities does not withstand criticism. There is a lack of coordination within the ministries as well. In the Ministry of Construction, Road and Municipal Machine Building the Volgotsemash is controlled directly by the central staff of the ministry. Yet in the same ministry the Krasnyy ekskavator production association is controlled by the ministry and by the all-union industrial association for producing excavators.

Up to this point we have not followed consistently and decisively enough the course toward integration of the financial and economic activity of enterprises that comprise production associations and we have been timid in our attempts at economic collectivization of them (the acquisition of the status of state enterprises without sufficient justification for this). There are many cases that arise either because of the personal ambitions of the managers or because of their inability to manage.

In industry as a whole at the beginning of 1981 of the almost 18,000 production units and independent enterprises, more than 4,000 production associations and 7,500 scientific production associations were formed, or about 42 percent were independent enterprises. In a number of branches this percentage is even higher: in the Ministry of Heavy Machine Building--86 percent, in the Ministry of Power Machine Building--83 percent, and in the Ministry of the Machine Tool and Tool Building Industry--80 percent.

Up to this point we still have not solved problems of establishing all-union industrial associations. In essence the all-union production association is still the traditional main board. According to the intention, the ministries should completely transfer to the all-union production associations (there are 500 of them) the management of production associations and enterprises. The provisions concerning them envision not simply renaming main boards, but creating large specialized production and economic complexes that are capable of solving problems of increasing production efficiency in the subbranch and performing those functions which cannot be carried out by the enterprises under their jurisdiction themselves when it would be expedient to relieve the ministries of them.

In fact this approach is not being taken in many cases.

Certain ministries regard the all-union production association as only an intermediate unit.

On the other hand, ministries and all-union production associations frequently look to production units, bypassing production associations, regarding such important questions as the allotment of funds for material resources and the entire complex of work for capital construction (financing, planning and so forth). This also reduces the effectiveness of the control of resources, and moreover it undermines the foundations of administration of the association as a unified economic complex.

Omissions in the creation of associations prolong extremely the realization of the advantages of the new organizational forms of administration of industry.

A good organizational and planning basis for further improvement of the administration of industry, in our opinion, would be the development of a unified master plan. In the process of this work it would be possible to solve problems of improving organization and administration of production and to continue the work for efficient branch specialization and providing the proper jurisdiction for industries.

The level of administration in terms of the branch would increase significantly as a result of the implementation of a number of urgent organizational measures, particularly with respect to machine building. In our opinion, it would be expedient to single out from the automotive industry a branch for producing bearings, even though it would include only 33 enterprises (including with a high level of mechanization and automation of production). In 1964 the volume of output of ball bearings increased more than 2-fold, and their production should increase at more rapid rates than those in machine building in general.

One should remove from the jurisdiction of branch machine building ministries the large specialized enterprises and production for smelting, stamping, forging and so forth, and provide for their development as interbranch formations under the jurisdiction of a special agency (perhaps the USSR Gosplan or the USSR Gosstab).

Centralization of the administration of automotive repair is becoming more and more crucial. This is now done by about 800 enterprises of 40 ministries and departments. It is apparently already quite possible to make the machine building branches responsible not only for the production, but also for technical servicing and repair of mass universal machines, equipment and instruments. The solution to this problem is especially crucial for automobiles, tractors, excavators, combines, diesel engines and other machines that are widely used. The experience of the VAZ convincingly shows the effectiveness of this approach.

During the course of the development of the master plan for administration of industry it would be possible to take the necessary steps for improving the organization of associations on an interbranch basis, taking regional factors into account. Even the decisions of the 25th CPSU Congress pointed out the expediency of creating large production associations and, if necessary, also industrial associations on the basis of homogeneous enterprises, regardless of their departmental jurisdiction. This decision is not being implemented even though its urgency has not decreased. For example, in Chelyabinsk there is a tractor construction association (Ministry of Agricultural Machine Building) and the Order of Lenin Plant for Road Machinery imeni Kolyushchenko (Ministry of Construction, Road and Municipal Machine Building). The products of the latter--scrapers and bulldozers--are based on industrial tractors of the Chelyabinsk tractor plant. In the interests of the matter these should be combined, but the different departmental jurisdiction does not make this possible.

The Organizational Administrative Mechanism

The sources of inefficiency in the development and implementation of master plans for administration of branches of industry lie in the inadequate development of the administrative mechanism for the branches and associations and the weak normative-methodological base of the measures that are conducted.

At the level of the branches, all-union production associations, production associations and scientific production associations, as experience convinces

us, the structuring of the administrative mechanism should be carried out without dealing with production-economic functions that are assigned to the corresponding subdivisions. Regulations of repeated measures should be developed and documented, including along the "horizontal" of interaction. The corresponding economic indicators, levers and stimuli naturally depend on the functions. All economic and organizational elements together, presented in the same language and represented in a single document will exert a coordinated, technologically regulated and planned influence on the object of administration.

One must say that such a mechanism is increasingly making way for itself, acquiring the nature of standards of enterprises, organizations, ministries and departments. Systems of control of product quality that are in effect in industry are widely known, and recently we have been creating more systems for control of the material-substantial elements of production (production capital, material supplies and reserves, wages and so forth).

Comprehensive systems for control of production efficiency are now being developed and introduced. Thus the system in effect at the Krasnodarskiy zavod radioizmeritel'nykh priborov production association contains 7 control subsystems: of labor resources, fixed capital and capital investments, circulating capital and material resources, financial resources, scientific and technical progress, the production process and product quality. The development of a complex of state standards for control of the enterprise is being completed and it is being tested in an experiment.

Measures for creating a branch organizational mechanism that were undertaken in tractor and agricultural machine building are of interest. This was the first of the machine building branches to introduce a master plan for control. It created a scientific center for improving the master plan for control which, along with the ministry, has developed normative documentation. The branch prepared about 180 normative documents in the following areas: measures for implementing party and government decisions regarding questions of administration and the creation of the master plan; provisions for subdivisions of the ministry staff and improvement of their activity; standard provisions concerning the service of the all-union production association, the production association and enterprises and improvement of the organization of their work; systems for controlling the most important aspects of production activity; measures for raising the scientific and technical level of production; improvement of control of scientific research and design work; evaluation of the economic effectiveness of measures for improving production organization; normatives for the number of administrative personnel, and so forth. All this multifaceted improvement of control has been carried out on the basis of unified methodological documentation, according to standard systems for functional interconnections of subdivisions of production associations, scientific production associations and others. In this branch measures for improving the organizational mechanism extend to all production associations. They are carried out on the basis of a schedule which is approved by an order of the minister as a mandatory part of the work for planning and developing production associations.

Planning Improvement of Administration

The processes of improving administration require state planning and development. Systematic, and not from instance to instance, attention on the part of administrative agencies to these processes should replace the first attempts at improving administration which do not meet the requirements of the time or the urgency of the problem either in terms of the inclusion of tasks or in terms of coordination with other sections of the plan for socio-economic development or in terms of the methodology for the development of indicators and sections.

Up to this point we have not determined the compulsory nature of the development and introduction of master plans, the periodicity of this work, or the structure and place of the master plan in the overall system of planned administration. Decrees that approve master plans do not envision their further development and are limited to a determination of the structure of the ministries and the composition of the all-union production associations, production associations, scientific production associations and units of administration.

Moreover the very development and introduction of master plans for administration have not become compulsory for all ministries (departments) of industry. Some ministries have not created these plans at all. There is no master plan for control of the production of construction materials. There are about 46,000 enterprises for producing construction materials, items, and structures on an independent balance, and there are only 735 of them in the system of the USSR Ministry of the Construction Materials Industry. The rest are controlled by 65 ministries and departments of union and republic jurisdiction. The leading subbranches that produce centrally distributed construction materials (cement, asbestos cement, industrial sanitation equipment) are dispersed among union and union-republic ministries.

On the basis of a unified state planned approach to solving problems of organization and control it is possible to eliminate the existing shortcomings and to mobilize large production reserves. It seems that it would be expedient for problems of the development of branch specialization, that is, problems that pertain to the master plan for control of industry as a whole, to be reflected in the program for scientific and technical progress for 20 years; improvement of the organization of the branches of industry--in basic directions for the economic and social development for 10 years; and measures for the development of production associations--in the five-year plans for all-union production associations and production associations.

Not only planning, but all organizational work for improving administration requires unified organizational, methodological and systematic guidance. Our economy has reached a level of development where further improvement of administration is becoming especially crucial, when administration has become a special production and economic function at all levels of management. The country does not yet have an agency in charge of the entire complex of problems that pertain to improvement of administration which coordinates scientific activity and provides methodological unity in the development of problems.

Individual aspects are handled by various departments. The USSR State Committee for Science and Technology is in charge of problems of automation of administration, the USSR State Committee for Labor and Special Problems--the development of organizational structures, the USSR Ministry of Finance exercises control over expenditures on administration, and so forth. As a result we are lacking the necessary comprehensiveness and a unified methodology.

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PLANNING, EVALUATING THE WORK OF COMPUTER CENTERS

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[Article by Yu. M. Kanykin, doctor of economic sciences, Institute of Cybernetics of the Ukrainian SSR Academy of Sciences imeni V. M. Glushkov, and N. A. Parfentseva, candidate of economic sciences, Main Information Computer Center of the Ukrainian SSR Ministry of Automotive Transportation (Kiev): "How to Plan and Evaluate the Work of the Computer Center?"]

[Text] Our country's electronic computer potential is increasing at rapid rates. Under the Tenth Five-Year Plan as compared to the preceding one the total computer capacities increased more than 4-fold. Along with them, there was an increase in the number of computer centers (VTs) as the main organizational form for the utilization of electronic computers. Computer centers have become a mass kind of organization (the number of them is approaching 4,000). The majority of them provide service for automated control systems of various classes and purposes, of which there are already more than 5,000. In a number of branches of the national economy under the past five-year plan up to 3 percent of the capital investments in the development of the branch went for computer centers and automated control systems.

The quantitative growth is accompanied by concentration and specialization of machine information production, its integration, and the creation of branch computer centers and computer centers for collective use on the basis of large multimachine complexes. The VTs, which has an independent balance, is on an equal footing with production enterprises. By the end of 1980 more than 700 of them were operating on khozraschet. Most of the computer centers under departmental jurisdiction (ministries, departments and enterprises) have been changed over to the new system of planning and economic incentives which has been envisioned for industrial enterprises by the decree of the party and government of 4 October 1965. The role of computer centers in controlling technological and organizational processes in the national economy is increasing, and the requirements on the efficiency of their operation are becoming more rigid.

Expenditures Instead of Efficiency

At first glance it might seem that the necessary basis has been laid for the computer center in the system of planning and the economic mechanism, and that it is only necessary to "refine the details," taking into account the specific features of machine information production. We have the corresponding decisions, instructions, provisions and methods. They include indicators of plans, methods of calculating them, rates for services, methods of determining deductions into the budget, payments for fixed capital, material incentive funds, funds for social and cultural measures and housing construction, and so forth. In a word, "everything is as it is at a plant."

Nonetheless the level of operation of computer centers cannot be recognized as satisfactory. Further "refinement of details" of the economic mechanism and calculation of planning indicators or new regulations will not produce essential changes in their operation. In 1975 the average daily load on electronic computers amounted to 11.6 hours, and in 1980--13 hours. This is considerably below the technical normative. The load on third-generation computers is less than average. Up to 90 percent of the idle time on electronic computers, according to data from investigations conducted in the Ukraine, is brought about by a "lack of information," that is, simply speaking, a lack of sufficient incentives both on the part of users and on the part of the computer centers themselves to set and resolve problems, especially those related to optimization. The latter constitute no more than 2 percent of the overall number of problems solved at the computer centers.

Of course one can give many examples of computer centers that are operating well. Thus at the VAZ the daily useful time of operation of electronic computers, not including time for preventive maintenance, reaches 22 hours. The managers of many enterprises cannot imagine their work under modern conditions without the utilization of electronic computers, especially as part of automated control systems for technological processes. Many departmental computer centers that are parts of branch automated control systems have helped to improve organizational processes (a typical example is the Pribor automated control system of the USSR Ministry of Instrument Making, Automation Equipment and Control System). But, unfortunately, these examples are not widespread.

The desire to provide for 3-shift operation of the machines which was prescribed, as we know, by the USSR Council of Ministers frequently gives rise to a formal pursuit of clients by the computer center, without taking into account the material with which the electronic computers are loaded (there are even cases of utilizing computers for typing and reproducing texts). The positive effect of computer centers on the economic indicators of the enterprises they serve is not great, especially on the growth of labor productivity, profitability and the reduction of the number of administrative personnel. Our questionnaires of managers of Kiev enterprises that have computer centers showed that more than half of them observe either an insignificant positive influence or a negative one from these subdivisions on production and administrative activity (the latter is reflected in complication of the

administrative procedures, duplication of personnel, perfunctoriness in decision making, and so forth).

Among the factors that lower the level of the operation of computer centers one usually finds the incomplete supply of technical means (especially a shortage of punch equipment), poor cooperation with computer center means, slow assimilation of third-generation technical equipment, the lack of skilled personnel, the lack of preparation of enterprises and organizations for the utilization of the capabilities of electronic computers and other technological factors. One cannot agree with this. But it seems that under modern conditions the main thing for raising the level of operation of computer centers and increasing their national economic usefulness are economic factors, more precisely the effectiveness of the planning and economic mechanism of these organizations.

In our opinion the planning and evaluation apparatus for computer centers contains essential shortcomings so that administrative agencies in trying to improve their functioning are all pushing different buttons.

In the final analysis improvement of the economic mechanism (the system of planning and evaluation) in any branch is determined by how completely and consistently the universal economic principle of comparing expenditures and results is realized in them. And this, in turn, depends on a correct selection of indicators of production outlays (expenditures) and final output (results) in physical and value terms. And if outlays for economic activity are taken for output, obviously the volume and quantitative indicators, regardless of how precisely they are calculated or how their monetary valuations are improved, will distort the real contribution of the enterprise and the level of its operation.

What should be regarded as the output (product)? To what does one link the normatives of expenditures and monetary evaluations? These questions, as a rule, are not simple even with respect to traditional kinds of production. Of course everyone knows that the main output of the automotive plants is the motor vehicle, and the metallurgical combine--steel, iron, rolled metal and so forth. And it never crosses anyone's mind to base the results of their activity on, say, the volume of expenditure of materials, the time of operation of the machine tool fleet or the time during which the blast furnaces are stoked up. Nonetheless, there are frequent situations where the notorious "point" in physical terms is clearly interpreted as extravagance (evaluation of a tube rolling industry or a heavy machine building plant in tons, transportation organizations in ton-kilometers, and so forth). True, in these cases monetary evaluations can be improved by incomes from enterprises which are formed on the basis of a value estimation of their actual output--not tons of pipes or machines, but concrete kinds of products in terms of the corresponding prices.

The situation is much more complicated with machine information production which is carried out by computer centers. Here the economic mechanism (system of planning and evaluation indicators in physical and value terms) generally does not realize the principle of comparing expenditures and results,

even in the distorted form in which it is realized by the economic mechanism that is oriented toward the "point" in traditional production. And this is brought about by the fact that in the practice of the economic activity of computer centers, regardless of how strange it may be, the very concept of output (final results) is lacking, for this, this concept, is not correctly interpreted.

The machine-information process is not a traditional kind of national economic activity and its peculiarities are related primarily to the specific features of its output. Regarding this one can say what K. Marx said about transportation and communications: ". . . there are independent branches of industry where the product of the process of production is not a new substantial product."* The product of the information processing industry is intangible; we cannot see, as it were, where to place the Emblem of Quality. With respect to computer centers it is not only a question of how to evaluate the result of physical and value terms, but of what to evaluate, what to regard as the result. And here one cannot even draw an analogy with such a "related" branch as communication. The point of the activity of communications enterprises and their functional significance consists in the processing and prompt movement of material bearers of information from the source to the addressee. For the postal service a letter that is sent is a unit of output, regardless of its content. A letter with no information is the same unit as a letter with an immense amount of information for the addressee. And the content (informational capacity) of telephone conversations is not significant to the telephone exchanges--the volume and quality of their work is determined by the time during which the channels of communication are open to the consumers and the reliability of these channels.

For the computer center the bearers of information are only the means of production, and the product is the information itself in the corresponding volumes and with the corresponding quality--that which removes for the users the indeterminacy in the control of technological, organizational or cognitive processes. That which provides stability and efficiency of their control systems. Utilizing specific raw material--initial information--the computer center produces new information which satisfies previously determined needs of the users. Herein lies the point of the operation (functional significance) of the computer centers. Yet the output of information is not planned and not evaluated.

But what is planned and evaluated?

The main planning indicator of the economic activity of the computer center is the volume of work in value terms. This indicator is formed through calculating expenditures of machine time (load on electronic computers in machine-hours) and expenditures of the time of programmers (in man-days) for the corresponding period of time (year, quarter and so forth). The machine-hour and the man-day are the physical measurements of result of the activity of the computer center, and the calculation of the cost of these units lies at the basis of the value expression of the aforementioned result. Qualitative (inform) indicators of the operation of computer centers (labor productivity, output-capital ratio) and also their monetary incomes, deductions into

*Marx, K. and Engels, F., "Soch." [Works], Vol 24, p 64.

the budget, material incentive funds and other funds are derived from the volume of work expressed in expenditures of machine and labor resources.

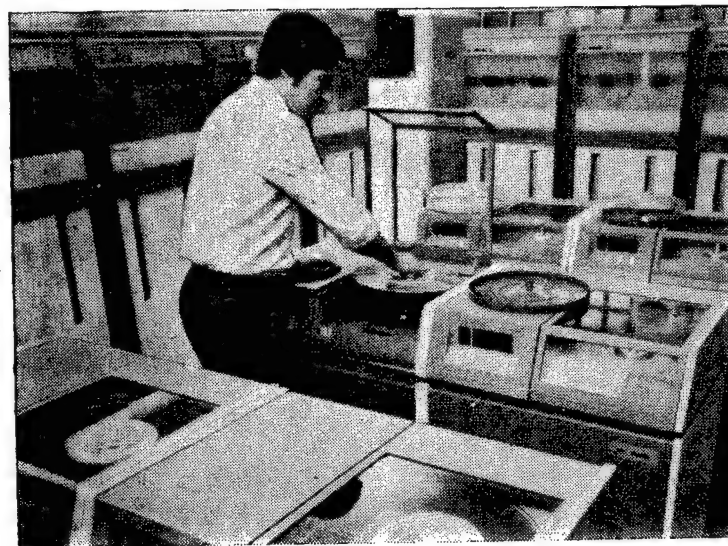
The average daily load on machines is thus the most important planning and accounting indicator of the production activity of computer centers and the level of their management. What volumes of information were processed on the machines during the period under consideration, what results of calculations (quantity and complexity of problems solved, prepared machine programs, algorithms, calculation indicators and so forth) were obtained, what was the effect of their utilization--none of this is taken into account. The methods for planning the time of operation of electronic computers also envision accounting for the subject matter of the work performed by the computer center, but this is done on the basis of subjective approaches and is rather perfunctory in nature.

Let us stipulate that we are not against such an indicator in and of itself. In the early stages of the utilization of electronic computers it could temporarily completely fill the role of an indicator of the overall results. At that time computers were regarded more as exotic instruments which the managers frequently did not know how to deal with or what to load them with. And it was necessary to have rigid requirements for the minimal loading of electronic computers in order to force the administrators to find ways of using them and thus justifying the resources invested in the costly equipment. These requirements are necessary now as well. But we are speaking not about administrative measures, but about the economic mechanism, whose effectiveness depends on the correctness of the determination of expenditures and results of the operation of enterprises. It is clear that the point of the functioning of computer centers does not consist in the consumption of machine time. A simple calculation of the hours of operation of electronic computers does not characterize the results of the work of the computer center. During the same amount of time problems can be solved that differ extremely in terms of the volumes of information, the complexity of the program and mathematical software that is used, the kinds of bearers of initial information, the economic effect and, finally, various expenditures of labor and other resources on preparing the initial data and creating the program.

In practice among computer centers of the same type with identical results expressed in useful time of operation of electronic computers there are immense differences in the number and quality of problems that are solved. This is explained to no small degree by the fact that among the problems solved with electronic computers there is an extremely small proportion of optimization problems--precisely those problems for whose solution the computer centers are primarily intended.

Shortcomings in measuring the volume of work of machine-hours as an indicator of results are especially obvious when electronic computers are changed over to new generations. The "weight" of the machine-hour spent by various types of machines can be as varied as the "weight" of the machine-hour of the operation of a motor vehicle and a high-speed airliner. The value of an hour of operation also varies within a considerable range, depending on the type of electronic computer. Machines of the third generation are complicated

complexes of technical means that make it possible to use them under multiprogram conditions when the operating time of the computer equipment is divided among users. The total time for carrying out assignments is thus greater than the operation time of the processor. An evaluation of the work of a computer center in hours of useful machine time with respect to the entire technical complex becomes an obstacle on the path to introducing intensive conditions for the operation of electronic computers and highly organized operations systems.



ЭЛЕКТРОННЫЙ ЗАЛ ВЫЧИСЛИТЕЛЬНОГО ЦЕНТРА ЦСУ СССР. ПОДГОТОВКА К РАБОТЕ НАКОПИТЕЛЕЙ НА МАГНИТНЫХ ДИСКАХ.

ФОТО ТАСС

Electronic equipment room of computer center of USSR Central Statistical Administration. Preparation for storage on magnetic disks.

But it is not only a matter of using the technical equipment of the computer centers. The expenditure indicator orients all subdivisions of the center and all categories of its personnel not toward better (intensive), but toward worse (extensive) work methods. For the worse the software of the problems that are solved, the longer the path to their solution predetermined by the algorithms and the greater the amount of machine resource that needs to be expended. Effective organization of the computing process requires a change-over to multiprogram conditions for loading electronic computers and the assimilation of packages of applied programs which make it possible to create an optimal schedule for solving problems. But there is no economic need for this since the computer centers are motivated to make maximum use of machine resources without respect to the result. If one compares the indicator of the volume of work of the computer center in machine-hours with the "point" of work of transportation enterprises, this is not even a volume of work in ton-kilometers, but simply time of movement of the rolling stock without respect to its load, speed, route or path that has been taken.

Another constituent indicator of the volume of work of the computer centers which has the nature of an expenditure is the number of man-days that are worked. It is used to determine the volumes of work in stages of algorithmization and programming, and it is calculated by multiplying the number of programmers by 230 (the number of established working days in a year). As we can see, in this case one proceeds only from the number of workers and the time normative for their work, that is, from amounts that do not reflect the actual process of labor, its intensiveness or its results. For two computer centers with the same average annual number of programmers this indicator will be the same even though their usefulness differs as does the volume of actual work performed (quantity and quality of algorithms and programs that are developed).

In 1976 a certain amount of improvement was made in the practice of planning this indicator. They began to use as a basis the base number of programmers and the base output and wages, stipulating a certain increase in these amounts during the planned year so that the increase in output would be greater than the increase in average earnings. The same normative of working days--230--applies to the increased number of programmers. Such improvements, obviously, do not change the essence of the indicator itself.

Such an indicator orients the computer center toward increasing the expenditure of labor resources, toward the simple presence of people in the working position, and toward the least labor-saving variants of algorithmization and programming. It does not motivate the computer center to specialize, to eliminate primitive methods of programming or to reduce the number of developers of algorithms and programs by expanding cooperation with specialized organizations for preparing software for computer processes. It is objectively advantageous for the computer center to have its own semiprimitive business for providing software for the computer process.

The Problem as the Indicator of Results

The time of people or machines that is spent on performing any work says little about the volume of work that has been done and says nothing about its quality or the usefulness of the result. But this is precisely what we try to use at all levels of administration to judge the utilization of the costly resources of computer centers.

What should replace these indicators? What should be the basis of the physical measurement of the product (result) of the operation of the computer center? In order to answer these questions it is obviously necessary to proceed from the functional purpose of electronic computers and the computer center as an organizational form for their utilization. This amounts basically to solving complex problems of control of technological and organizational processes in the enterprise, association, branch or the national economy as a whole--mainly those problems whose solution involves processing large volumes of information through the necessary operational conditions (dictated by the course of the production processes). The task of the computer center is to provide the solution to a certain system of planning and administrative problems, precisely those which either cannot be solved by traditional manual

methods (because of their complexity and the large volumes of information to be processed) or require excessively large expenditures of administrative labor. The task can thus be the unit of output of the computer centers as organizations for providing information support for the processes of control in various units of the national economy. The contribution of the computer center to the functioning of the enterprise or the branch amounts to the difference between the entropy of the system of "input" problems and the remaining entropy (entropy of "output" problems). Information theory, as we know, provides methods of measuring this entropy, in any case with precision that is acceptable for economic practice.

The task in this case interpreted not from the content, but the technological side, in this sense a formal one. It is a particular totality of initial data and a complex of mathematical, program and information software that is developed and introduced into operation with the application of computer equipment in order to obtain output information that satisfies given requirements of the users (including the computer center itself).^{*} We are speaking not about unique computer centers that serve fundamental science (nuclear and space research and so forth), but about most of the typical computer centers that operate at enterprises and branches of the national economy. Here the group of tasks is fairly clearly defined and they can be categorized. The initial problem can be broken down into modules (individual parts) from which programs are written for its solution.

In this interpretation the problem can be the means of measuring the volumes of the final output of the computer center as the result of the main kinds of its activity which pertain to its own computer process and to the development of algorithms and programs. Consequently it can be the object of planning, norm setting and evaluation of the work of the computer center.

The main difficulty here is the commensurability of the problems themselves, the reduction of complex problems to simple ones. It is clear that problems vary both in terms of their consumer value (usefulness for the consumer) and in terms of the expenditures on their preparation and solution (operation).^{**}

^{*} In the "Standard Time Norms for Programming Problems for Electronic Computers" of the USSR State Committee for Labor and Social Problems (Moscow, 1981, p 3) the task is interpreted as follows: "By the task we mean the complex of programs and data that require the machine resource for their solution. Here group means tasks carried out by the subsystem of control or accounting. For example, accounting for fixed capital or accounting for material values in the subsystem "Bookkeeping."

^{**}The possibility and expediency of using the concept "problem" as an object of planning and evaluation of the basic activity of computer centers are pointed out by several authors, who also note the difficulty of comparing problems solved with electronic computers (see, in particular, Yasin, Ye. G., "Problems of Investigating Information Control Systems," *EKONOMIKA I MATEMATICHESKIYYE METODY*, 1974, No 3, p 459; Kutsenko, S. P., "Proyektirovaniye i organizatsiya vychislitel'nykh ustanovoki system (nekotoryye problemy industrii informatsii)" [Planning and Organization of Computer Installations and Systems (Certain Problems of the Information Industry)] - Kiev, 1973, p 78.

The tasks can differ in terms of the volume of machine memory that is used, the time of operation of the processor necessary for setting them up and solving them, and the complexity of the logic (structure). These aspects are reflected in the volume of the mass of initial information and in the complexity of the set of program means. And this, in turn, can be reduced to the concept of the "informational volume of the problem" which has quantitative expression (in bites, symbols and signs).

Of course the changeover to "problem-by-problem" planning of the volumes of work of computer centers requires a preliminary development of a whole number of technical and economic problems. At the present time there are no sufficiently substantiated data about the complexity of tasks. But technologists do not doubt the possibility of the commensurability of tasks of various complexity with the help of the average number of commands on the electronic computer that are necessary for processing one symbol of input data. Incidentally, the United States has extensively taken up the practice of using such an indicator as the cost of one operation. It lies at the basis of calculating the services of computer centers in value terms. Such amounts as the number of operations, commands, symbols, bites and signs, as we know, can easily be compared with one another.

Of course there will be a certain conventionality here and also omissions that are inevitable when organizing the planning and accounting for any economic phenomena and processes. But it is important that there is an inherent possibility of commensurability of various problems solved on electronic computers that is accessible in practice and also the possibility of reducing complicated problems to simple ones. Let us note that the problem of reducing complicated problems to simple ones is no more difficult than the problem of reducing complicated labor to simple labor. And although in practice, as we know, in the area of commensurability of complicated and simple labor there are considerable omissions, nonetheless economists do not doubt that this problem can be solved with an amount of precision that is acceptable in practice, which also lies at the basis of differentiation of payment for labor.

It will also be necessary to solve a number of particular problems. There are newly assimilated problems and those that are regularly solved. The number of assimilated problems and the number of solutions (periodicity of the work on the problems) are not identical concepts. When determining the volumes of work of computer centers it is necessary to "weigh" the number of assimilated problems in terms of the number of solutions in the report period. It is necessary to develop and introduce into practice certain additional indicators that characterize the quality of work (output) of the computer centers. Among them can be, for example, the reliability of the results, their computability and their efficiency (time of fulfillment of the programs from the input into the remote devices to the receipt of information on the display or the printer of the user) and so forth.

The changeover to planning and evaluating the activity of computer centers utilizing problems (as the measurement of the results) will not immediately disclose the difference between computer centers that are operating poorly

(perfunctorily) and well (this difference, as was already said, is erased by such expenditure indicators as the volume of work in hours of time on the electronic computer and man-days). But the goal of the economic mechanism amounts to automatically revealing the best and worst enterprises from the standpoint of their national economic usefulness. On the other hand both the managers of departments and enterprises that have computer centers will think about how to restructure their operation in such a way as to be concerned not about formal consumption of costly resources, but about the real final result.

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SCIENTIST DISCUSSES BUREAUCRATIC PROBLEMS IN PRODUCING NEW INDUSTRIAL DETERGENT

Novosibirsk EKO: EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA in Russian No 3, Mar 83 (signed to press 26 Jan 83) pp 61-79

[Article by A. F. Koretskiy, doctor of chemical sciences, laboratory chief of the Institute of Inorganic Chemistry of the Siberian Branch of the USSR Academy of Sciences (Novosibirsk) and commentary by Yu. P. Voronova, candidate of economic sciences: "The Thorny Path of Introduction"]

[Text] When reading the tale by Korney Chukovskiy, "Moydodyr," one might think that it is a simple matter to introduce cleanliness. But the chief of the washbasins and the commander of the brushes was not developing detergents; he was using ready-made fragrant soap. Otherwise things would hardly have turned out so quickly and well for him. One recalls this when one becomes familiar with the history of the introduction of the Termos detergent.

Commentary. Its creator, Aleksandr Filippovich Koretskiy, was studying in Leningrad at the Institute of Water Transport Engineers during the blockade and had to complete his studies in Gorkiy. The young mechanical engineer was assigned to the Astrakhan shipyard where he worked for 15 years, climbing the service ladder from a rank-and-file engineer to the head engineer. In Astrakhan A. F. Koretskiy had to solve a problem: how to wash the petroleum residues from the Volga river barges.

In the 1950's a "second Baku" was developing, and bulk oil transportation on the Volga and Caspian was a powerful industry. The river barges transported oil from Ufa to Astrakhan, where it was pumped into tankers and shipped to the oil refineries in Baku. After the oil was poured from the river barge with a capacity of 10,000 tons there remained from 300 to 600 tons of oil, a half-meter layer on the bottom of the hold. The unpurified crude sulferous oil from the "second Baku" contained dirt, pebbles and so forth. During 20 days of sailing a layer similar to asphalt was formed and it had a strong odor of benzine. At a low temperature it reminded one of pavement and one could walk on it. The layer increased with each trip

I had to deal with the problem indirectly since the dirty barges and tankers could not be repaired. Any repair work on them, particularly autogenous cutting and welding involved the danger of explosions. As the plant's head

engineer I took on the responsibility of mechanizing pre-repair washing. The solution appeared simple and clear at that time: mechanical cleaning. The difficulties at that time were only technical, and it was not necessary to convince the management of the urgency and expediency of this. The task was of state importance.

I was instructed to create a special design bureau immediately in Astrakhan and was permitted to invite people from any enterprises of the branch. At first there were 15 of us, but now the special design bureau has its own experimental enterprises, testing facilities and so forth. Forced ventilation of the holds was introduced very quickly, and the people could work without subjecting themselves to the danger of toxification.

Subsequently we began to introduce mechanical means of cleaning. The most effective were hydromonitors, but even they could not completely keep up with the growing layer. Then our hopes were raised by chemistry. We turned to the Institute of Physical Chemistry of the USSR Academy of Sciences, to academician P. A. Rebinder. He recommended using soap solutions. But after the war there was not enough soap even for the people and therefore he also advised trying bentonite clay. We managed to develop a highly effective "solid" emulsifier using bentonite clay. Small amounts of this emulsifier in an aqueous solution made it possible for the streams of the hydromonitor to wash away the layer of petroleum residuals. The emulsion obtained as a result of this could easily be pumped out with the pumps, but it was so stable that it was pumped into pits along the bank where it remained for a long time.

In the end many thousands of tons of residuals accumulated along the bank, and it was difficult to utilize or destroy them. Complaints were made against us: by doing one good thing do not destroy another. Another problem arose: how to introduce the emulsion into the cleaning system again and at the same use the petroleum residuals contained in the discharges. It was necessary to immerse ourselves completely in colloidal chemistry. As a result we found other emulsifiers that facilitate the restoration of the discharged wastes and provide for work with a closed cycle.

Information about the work that has been done was reported at one of the conferences of the Institute of Physical Chemistry of the USSR Academy of Sciences, academician P. A. Rebinder suggested that I prepare a candidate's dissertation since in addition to the practical value, all of our work at the plant had scientific value. He accepted me as a graduate student and since that time I have frequently thought about this fact. Imagine: a plant engineer, a mechanic by specialty, the results of whose work on solid emulsifiers contradicts the theory of P. A. Rebinder himself which was generally accepted at that time. And the author of this theory invites this plant worker to be his graduate student.

For two years the ministry would not allow me to go to graduate school, but then in 1957 I managed to tear myself away, and at more than 30 years of age I "changed" my occupation as a mechanic and became a chemist. In 1960 I defended my candidate's dissertation on the subject: "On the Mechanism of Action of Solid Emulsifiers." Almost immediately after this while still in

Moscow academician A. V. Nikolayev invited me to work as chief of the design bureau of the new institute in Novosibirsk--the Institute of the National Economy of the Siberian Branch of the USSR Academy of Sciences.

During all that time (graduate school, the period of establishment of the Siberian Branch of the Academy of Sciences) I did not lose contact with the design bureau in Astrakhan, with the Ministry of the Maritime and River Fleet or with the Institute of Oceanology. By that time a collective of scientists dealing with the problem of cleaning petroleum ships and railroad tankers had been joined together by common interests. This subject was considered important by the State Committee for Science and Technology and was included in the work plan: it has remained a part of this plan since 1965. The title of the subject has almost not changed: "The development of physico-chemical bases for applying surface active substances when creating means for technical application in various branches of the national economy for cleaning and washing metal and other surfaces instead of substances that involve the danger of fire."

In conjunction with the Institute of Oceanology, as early as the beginning of the 1960's we developed the ML-6 detergent and the technology for cleaning tankers which transported petroleum to Cuba and were to bring sugar back. It was in those years that this was such an urgent practical task, and it was successfully carried out. The Institute of Oceanology tested the new detergent and the tankers brought in sugar, thus proving the possibility of shipping sugar in containers that had previously held petroleum.

We managed to cope with another task during those years: cleaning the tankers for shipping whale oil on the return trip. The tanker delivers petroleum products to the region of the whale industry and takes on whale oil. During the time of washing the tanker we gathered all of the oil. An analysis was conducted: it was excellent oil.

We had not only to clean and wash the tankers, but also to return what we had washed out of them to the national economy. In other words it was necessary to restore the products and remove the detergent from what had been washed away.

Regeneration, like the problem of creating closed cycle technologies in general, goes beyond the framework of an individual enterprise. This is a task for programs on a national economic level.

The most serious work of those began in 1965 in conjunction with the Astrakhan special design bureau for methods of mechanization of the cleaning of river petroleum barges with a simultaneous solution to the problem of recovering the petroleum residuals. We became oriented toward a closed cycle. Studying the surface active substances (PAV), we separated out those PAV's whose properties depend on the temperature. The concept was quite understandable: by changing the temperature it is easier to regulate the properties of the substances under production conditions. Everything was envisioned as follows: it is necessary to select a substance with a maximum cleaning effect at

ordinary temperatures for working. Then the washing solution with the residuals of the washed away substance is heated to 5-10 degrees and its properties change to such a degree that it is possible to separate the detergent from the mixture and to use it again. During those years we also raised the problem of creating technology with recirculation.

In 1969 we completed interdepartmental testing and the construction of a special cleaning station for mechanized cleaning of barges at the Astrakhan operation section of the Volgatanker steamship line. But the main thing was that in 1969 we completed the development and production testing of an effective detergent--Termos-1. TE--thermo, R--regulated, MO--washing, S--substance. Thermoregulating detergent. The first variant.

Commentary. Now, after many years which have not been crowned with the success of the introduction of Termos-1 on an industrial scale, in Aleksandr Filippovich's words there is something which cannot be expressed in words, but only with intonation. Bitterness? Indignation? Hardly. A soldier at the front enumerates his battles this way or a sailor the storms. A certain degree of aloofness. When a sailor fights against the elements it is not a matter of oceanology; it is necessary to make sure that the ship keeps its nose towards the waves. In exactly the same way a doctor of chemical sciences is not up to figuring out the defect in the economic mechanism. He is simply vexed about the bad weather

Thermoregulating detergents, their theory and practical application--this is an entire scientific area, the essence of my doctoral dissertation. Knowing the fundamental properties of surface active substances and the dependency of these properties on concrete conditions and temperatures, we can recommend one formula or another with given properties that is most suitable for particular production conditions.

I have worked in the plant for 15 years and I always begin my research ideas with the final result, with that which must be achieved. Testing at the enterprise is the highest level of testing of a scientific idea. Sometimes one hears: "washing? think chemistry!" In schoolbooks it is written that the basis of a detergent is lather. Increased surface contact provides for success in washing. The more lather the greater the washing effect. But then the consumers have become familiar with nonfoaming detergents. Of course chemists did a large amount of theoretical work before this. The washing effect is a complex process that takes place on the border of new phases, in a place where various substances meet with various physical and chemical processes. The molecules of the PAV of the detergent, being adsorbed at these boundaries, can essentially change the force of the effect, facilitating the removal of grime from the surface that is being washed. But this is still not enough. Another law that is increasingly attracting the attention of scientists, including ours, is a fact that is known to all housewives. For simplicity's sake it can be formulated as follows: the grime itself does not come off, it must be wiped away. In other words, mechanical work is necessary. The amount of this work depends on the properties of the surface that is being washed, the dirt and the detergent. The better the detergent the less mechanical work one needs to expend to clean the surface. This is

physico-chemical mechanics--a new scientific area in colloidal chemistry which was created by academician P. A. Rebinder.

Many large companies that have sprung up since World War II are chemical companies. And they are based on synthetic detergents--a mass product which brings colossal profit. But all of them, of course, hold the position of representing "pure" science. The temptation to abandon oneself to the profit business is great and sometimes it completely takes over eminent researchers. Thus one American scientist who is a specialist in physical chemistry whom I met in Barcelona in 1968 made himself a fortune, figuratively speaking, on "soapsuds," that is, on income from scientific ideas in the sphere of detergents. We certainly do not intend to derive personal advantage. But toward what are all our ideas directed? Toward increasing the efficiency of the socialist economy.

Soviet science is steadily and correctly oriented toward its link with production. We have tried to provide this link on a scale that corresponds to our capabilities. It is understandable that the main goal of the academic institute should be in-depth research of the processes so that recommendations are not random discoveries. This is the distinguishing feature of fundamental research (we should not confuse this with the superficial understanding of fundamental as meaning the lack of direct usefulness).

As the requirements for protecting the environment of the Volga Basin became greater, it was necessary to construct purification stations of the closed type. In 1969 we conducted experiments and demonstrated that it is possible to clean the barge of fuel oil (even benzine, and this is a difficult task) in 4 days instead of 30. The labor-intensiveness of the cleaning decreases from 3,000 to 160 man-hours of manual labor. The document concerning the success of the experiments was authenticated by the minister of the river fleet, S. A. Kuchkin, and academician A. V. Nikolayev. We were ready to shout "hurrah" and close the file on the subject in the plan for scientific work.

But it did not turn out to be that simple.

The ministry went to the USSR Gosplan with the news that the preparation was approved and that is needed 150 tons of chemical substances that are produced by the Dzerzhinsk plant for fatty alcohol of the USSR Ministry of the Chemical Industry. On instructions from the USSR Gosplan, in 1974 Soyuzglavkhim answered that they did not have the required components (OP-4) but there were others--OP-7 and OP-10, of which they could have as much as they wanted.

I shall explain this incident. We were working with nonionogenic PAV of one group. We shall call them OP-4, OP-7 and OP-10. They all consist of the same components. The preparation of the substances is done on the same equipment. But in one substance there is more ethylene oxide and in the other there is less. The technology for the preparation is so simple that the same equipment is used to prepare OP-4, OP-7 and OP-10. But they do not make enough OP-4: about 450 tons, and OP-10--30,000 tons. We began to ask that they make 150 tons more OP-4 instead of OP-10. Up to this point we had been receiving

information from workers of various levels that it was impossible to produce OP-4. This was apparently because of the incompetence of the managers or the lack of desire on the part of the head specialists who undoubtedly knew the technology for producing nonionogenic PAV.

The red tape took two years. Finally workers of the Astrakhan purification station sent a letter to a newspaper: help us eliminate heavy manual labor and help us arrange production of an effective detergent. It was explained to the workers that the country does not have any PAV and therefore it was too early to introduce a new washing preparation.

In spite of the refusals from official offices, thanks only to the efficiency of the suppliers, during this time we managed to obtain up to 60 tons of OP-4 and OP-10 from the plant, and we ourselves prepared Termos preparation for experiments at enterprises of Novosibirsk and the oblast. Successful experiments were conducted in a number of plants of Selkhoztekhnika, both in the European part of the country and in Siberia, in Oyash. The Oyash repair and mechanics plant, which is located 110 kilometers from Novosibirsk, is part of the Novosibirsk Selkhoztekhnika association. The plant repairs motor vehicles for all agricultural enterprises of the oblast. They learned about the Termos-1 detergent in 1974 from a small notice published in the newspaper SOVETSKAYA SIBIR'. Plant representatives wrote an appropriate letter and came to the laboratory of A. F. Koretskiy. The negotiations ended successfully and they returned to Oyash with 3 barrels of Termos. Termos was used successfully for several years to wash cylinder blocks of automotive engines. The cylinder blocks of well operating engines--the readers will be spared the technical details--in addition to other things have two typical features: they have resinous deposits and burnt places, and also the channels of the oil line system that are drilled in the blocks are clogged up. The detergents that are widely used do not wash out the system of oil lines. There are special washing machines for each type of engine. The enterprises know of these only from word of mouth because the specialized equipment presupposes a concentration of repair work that is impossible. There are no methods of checking to see how well the engine is washed before repair. This is clarified during the course of operation of the engine. Advertisements point out the reasons for the rapid breakdown of engines after repair. Among these reasons there are those that pertain to poor-quality washing. Then, naturally, it is also possible to evaluate the effectiveness of the detergents. When the plant temporarily failed to receive Termos all the waves of complaints pertain to defects in the cleaning of the oil supply system. This shortcoming outweighed all the rest of them. An unexpected experiment showed that the quality of washing is the primary constituent part of the quality of repair.

The plant was dissatisfied with the interruption in the supply of Termos. The Oyash plant is supplied with detergents by the Siberian division of the USSR Academy of Sciences, an organization that does not have sufficient supplies of the preparation.

The rejected cylinder blocks were piled up against the wall and it was as though a border separated them: on the left were unwashed blocks with black

burnt places on the surfaces burnt down to a caustic, and on the right--cylinders that one would not immediately recognize as old, those washed with Termos.

Among the drivers that come to Oyash for repaired vehicles from all the villages of the oblast there was the rumor: some were given new cylinder blocks. Apparently depending on who they knew. The rumor was started most likely by a driver who was unfamiliar with the achievements of chemistry but was knowledgeable about human relations. In the end the drivers were convinced that that year all of the cylinder blocks would be just like new.

In 1975 the newspaper SOTSIALISTICHESKAYA INDUSTRIYA entered into solving the problem of industrial manufacture of Termos concentrate, which was now already 10 years old. A. L'yakov, a Novosibirsk correspondent of the newspaper, published an article in which he did not mince words and drove home the point.

In the aforementioned article in SOTSIALISTICHESKAYA INDUSTRIYA the author gave the names of the deputy ministers responsible for this problem in the Ministry of the Chemical Industry and the Ministry of the Petrochemical Industry. He also noted that the preparation had been tested and proved, but nothing further was being done and it should be done. The two deputy ministers wrote a letter to the editorial staff saying that the Termos preparation was unsuitable also because it is not biodegradable and cannot be discharged into the water. They ignored the fact that we use a closed cycle.

Additionally, the two deputy ministers amicably pointed out that their ministries have other developments whose results can be used. Moreover, there is no possibility of producing the preparation since there is no ethylene oxide.

Although the two deputy ministers agreed in this case, their ministry is divided by a "boundary." The Ministry of the Chemical Industry is producing various PAV's for household purposes, and the Ministry of the Petrochemical Industry produces them for industrial purposes. Therefore the Ministry of the Chemical Industry does not deliver Termos to the other ministry. The Ministry of the Petrochemical Industry plays the role of a requester. When the discussion of this came to the Dzerzhinsk plant for fatty alcohols (under the jurisdiction of the Ministry of the Chemical Industry), the head engineer agreed that it is possible to manufacture the preparation, but that the petrochemical workers produce their own raw material. "They have better raw material, so let them give it to us and we will produce the preparation." As we can see, the way was blocked when one ministry refused to have commitments to another.

Commentary. The interests of the Ministry of the Chemical Industry in the sphere of household detergents are protected by the ministry's head institute in Kiev, and those of the Ministry of the Petrochemical Industry--by the All-Union Scientific Research Institute of PAV in Shebekino, a small city in Belgorod Oblast.

In Shebekino they handle industrial detergents, but not only them. The main thing is that they determine the ministry's overall policy in this sphere.

They admitted in the head institute that our preparation is suitable for electrical equipment, but for other things the Shebekino developments are better. A classical situation: "mine--yours."

At the experimental enterprise of the VNIIPAV of the Ministry of the Petrochemical Industry an experimental batch of the detergent was prepared nonetheless--10 tons of Termos concentrate. But all of the components were obtained from enterprises of the Ministry of the Chemical Industry. This batch was tested in cleaning electrical equipment at enterprises of Siberia. The enterprises unanimously came to the conclusion that it is necessary to arrange industrial production of the preparation.

Commentary. Our conversation with an engineer of the Novosibirsk repair and adjustment enterprise pertained to a specific situation. The Shebekino VNIIPAV ordered them to prepare an experimental batch of Termos and they produced it. But they refused to deliver this "trivial material." And it was necessary to send from Novosibirsk a car with empty iron barrels so that this detergent could be put into them near Belgorod. Only then did the barrels full of Termos leave the warehouse of the repair and adjustment enterprise for Novosibirsk enterprises. As an experiment. The experiment was prolonged.

We are well aware that the simplest and most advantageous thing to do from the national economic standpoint is to assimilate the production of Termos preparation at the Dzerzhinsk plant for fatty alcohols. To do this it is sufficient to mix the two preparations that are already being produced at the plant, OP-4 and OP-10, without shipping the components over thousands of kilometers to Shebekino for mixing. Moreover we have already developed and tested the simplest technological plan for mixing which is also suitable for plant needs. But repeated appeals to the deputy minister of the chemical industry have led to naught. The main argument: the ministry is not obligated to produce detergents for industrial purposes. For these one must turn to the Ministry of the Petrochemical Industry

A collective request was made to the minister of the petrochemical industry for organizing production of the Termos concentrate: from the chairman of the Siberian Branch of the USSR Academy of Sciences, the first deputy minister of machine building, and the director of the Sibsel'mash association. But the Ministry of the Chemical [sic] Industry limited itself to manufacturing a 10-ton experimental batch of the concentrate in Shebekino. Yet the Salavat petrochemical combine has assimilated the production of the initial components on the basis of fatty alcohols, from which it is quite possible to manufacture Termos detergent. It is necessary to return to this problem again.

In 1979 the minister of the chemical industry came to Akademgorodok. Here there was a travelling meeting of the board of the ministry in conjunction with the Presidium of the Siberian Branch of the USSR Academy of Sciences. I was called and requested to present the essence of the matter briefly, to tell the minister clearly what needed to be done. I limited myself to one request: to give us each year up to 1985 20 tons of preparation for closed cycle technology. It was decided immediately: they would allot it! In the

first year, 1980, we were delivered 11 tons instead of the 15 planned for the first year, and in 1981--4.5 tons. In 1982 we received none. The plant requested that we have the corresponding funds for the manufacture of the required tons allotted from the main supply administration of the chemical industry. I called the head specialist for PAV in the main supply administration. I explained about the decision of the board of the Ministry of the Chemical Industry. In response I heard that familiar irritating voice explaining loudly to someone: "Koretskiy is calling again about his 'Termos'!" And to me he said: "We will allot nothing for producing Termos, let the Ministry of the Chemical Industry itself find the internal reserves." And that was all. The circle was closed just as it was 8 years ago at the main supply administration of the chemical industry.

One of the areas of application of the Termos preparation we have developed is washing of electric engines and electric generators during repair. The additional complexity here lies not only in the fact that in addition to oil it is necessary to clean out dust and soot, but also in the fact that after cleaning it is necessary to restore the insulation resistance. It is wrong to use benzine here. The resin that makes up the insulation can be partially dissolved and the insulation resistance drops below the norm.

Representatives of one Novosibirsk electrical repair enterprise tried for several months to talk us into taking on this problem. We suggested that they use harmless aqueous solutions of PAV.

First of all it was necessary to prove the effectiveness of our suggestion. Workers of our laboratory rolled up their sleeves (literally) and showed up at the enterprise with rags and buckets. They washed one dismantled generator. They measured the insulation resistance. It had dropped. They asked that it be dried but, as I now recall, it was on a Friday at the end of the day. It was summer and everybody was hurrying home. They decided to put the stator of the generator, weighing about 2 tons, out on the street and to leave it out in the fresh air until Monday. On Monday morning the director of the enterprise met us in the hall. He led us to the generator and said: "Here is your result. The insulation has been restored, and brought up to the point where the electrical part of the generator can be considered new." The experiments showed that this method could be introduced.

And they started to introduce it. One document for introduction after another was signed. For partial or complete washing of mobile electric power stations. It took three months for an electric power station operating in the Far North to be dismantled, shipped, repaired, reassembled, tested, shipped back, assembled, tested and put into operation. Since our detergent can be used under field conditions, it was not necessary to ship the stations and the three months were reduced to six days. We conducted this experiment along with the repair shop in Magadan Oblast. After several washings with our compound they observed the generators for an entire year, regularly measuring the insulation resistance. Everything was normal.

After a certain amount of time we suggested to the enterprise: let us apply for a patent on the method of operation. One way or the other the effect was

good. Somewhat embarrassed, they answered us: "You know we have already obtained it" So this is not so much the psychological, but the moral aspect of the link between science and production.

The matter was tested more seriously at Sibselsk' mash--the preparation of parts before galvanization, the so-called preliminary degreasing of surfaces. Properly speaking there is nothing pure in the world. When we wash one kind of grime from the surface, another immediately settles on it. It is not just a matter of washing, but of obtaining the kind of "grime" we want on the surface. If a metal part is washed before a galvanized coating is placed on it, the detergent is selected in such a way as to obtain the "grime" of the surface which is necessary and useful for galvanization. But if the surface is simply cleaned, one ends up with a random kind of grime which is unregulated and unnecessary. It must be removed and another applied. This is the only way the problem can be handled.

We also made a suggestion for solving the problem of degreasing before painting in the body shop of the Volga automotive plant. Before painting it is necessary to remove the greasy substances from the bodies of passenger cars. The painting is done by immersion. They like to show this industrial process in movies and on television. But before it it is necessary to take a rag soaked in white spirit and rub everything that will then be immersed in the bath. It is not difficult to rub down the outer surface or the main inner surfaces. But there are parts of the inner surfaces which it is difficult to rub with a rag. There are sections which are not cleaned and then the paint does not adhere well. And these places later become sources of corrosion. The production workers refused to consider the possibility of introducing a new method of removing greasy substances because it would increase the production cost of the manufacture of the vehicles. But, unfortunately, nobody thought about whether it would be more advantageous than to replace the rusted parts of the body every 3-4 years. This is disadvantageous for the owner of the vehicle. It is apparently disadvantageous for the state as well.

One of the aspects of the contacts between science and production is the calculation of the economic effect. So far it is not clear who should do this. Until recently we chemists who are working in the Academy of Sciences have not been especially bothered by the calculation of the economic effect. And now we are trying primarily to become familiar with the calculations that are made at enterprises or in branch organizations. But since it is not determined who is responsible for the reliability of the calculations, there is frequently mutual misunderstanding. An economist from our institute goes to the Ministry of Power and Electrification, having learned that in this ministry there are calculations of the effectiveness of detergents when repairing equipment. First he is received as an inspector, and then, having calmed down a little, they begin a weak defense: "You have submitted applications for invention? This means that you have calculations. Use your own, ours are no good for anything. We will not recognize them in any case."

When dealing with the introduction of innovations I came to the firm conviction that the introduction should proceed according to a clear-cut technology. To arrange things and rely on local, private and noncompulsory agreements

means deliberately to doom oneself to failure. This is the feeling that we are getting ready to jump on a moving train and when we look we see that the cars not only do not have stairs, but do not have platforms either Everyone has a plan! No one has any time! At the aforementioned Novosibirsk repair and adjustment enterprise we tried to introduce a closed cycle for cleaning. "Why do this?" they asked us. "We are pouring the washed away substances on the territory of the neighboring enterprise, and they burn it and are thankful for it." "For the sake of science," we say. "For the sake of the plan," they answer us, "it is still possible, but for the sake of science it does not make any difference how others do their work."

Commentary. Various factors interested the plants who are neighbors of the Siberian Branch of the Academy of Sciences in introducing the new detergent. At the Oyash repair and mechanics plant, as we know, there was no special reason. They read the note in the oblast newspaper and came to Akademogorodok.

At the Novosibirsk repair and adjustment enterprise of the Ministry of Power and Electrification they would perhaps still be washing components of mobile electric power stations with benzine if it had not been for that incident. In the spring of 1976, one day before dinner break a master noted that not far from the washing chamber, in spite of the fact that it was daylight, an electric lamp was burning. Motivated by a natural desire to strive for economy, the master pressed the switch. A hardly noticeable spark within the switch activated a detonator. There was an explosion. This gave one pause. It finally came to the Siberian Branch of the Academy of Sciences, which is located in that same Sovetskiy Rayon of Novosibirsk.

Everywhere where the Termos detergent has been introduced there has been a large amount of correspondence. Having heard about the innovation they write from all parts of the country and ask about the technology and where to acquire it. Production workers answer accurately, understanding well that they themselves can end up in the same situation. At the Novosibirsk repair and adjustment plant within 10 minutes they drew up a selection of addresses. Representative geography: Odessa and Kharkov, Moscow and Tselinograd, Lvov and Saratov, Irkutsk and Karaganda, Ufa and Novgorod--all corners of the country where there is interest. But why must a small technical division of the enterprise handle this work? Where are all the powerful information services which allow the situation where the world-known First Model Printing House imeni A. A. Zhdanov had to turn for advice on how to clean type face to the small village of Oyash in Novosibirsk Oblast?

The largest flow of letters is still coming into the laboratory of A. F. Koretskiy himself. If he were to answer each letter individually it would be necessary to stop the research. But it is also impossible not to respond to them. A compromise decision has been made. To send a standard answer to any question about the Termos preparation: "it is used in this place and in that place, it is not being produced, its production depends on" If you write to the Institute of Inorganic Chemistry of the Siberian Branch of the Academy of Sciences you will also receive this standard reply. It is a unique umbrella for researchers standing in the rain of questions from the consumers. And perhaps the Academy of Sciences should have its own information

center? In order for the efficiency of the satisfaction of demands to correspond to the idea about this vanguard of science?

I wish to share another observation. Practically the main element in the process of introduction is good human relations, mutual interest. Let us turn to the problem of the boundaries between ministries. We decided to create a household detergent and to establish contact with the Novosibbytkhim enterprise. For two years they came to us for small batches of concentrated preparation and manufactured experimental batches of the detergent in aerosol cans for automobile drivers. But they did not agree to extensive introduction of it. It was necessary to go to the head institute in Vilnius. What can the representative of the enterprise take there? They said they do not need developments, they have developed a better detergent in Novosibirsk This is that same betrayal of the interests of the branch. No, we had to go to the head organization in Vilnius, thus representing the completely understandable mercenary interest of developers from outside.

Several years ago we went to the State Committee for Science and Technology. The following statement was made to the developers of the Termos-1 preparation by the committee's head of the chemical division at that time: "You are somewhat ahead of your time. Wait about 15 years. We will arrange production of PAV then, when, perhaps, industry will be ready to receive your preparation"

Commentary. The reason for refusing industrial assimilation is the main thing that bothers us in this story.

The fact is that even with the current shortage of nonionogenic PAV, many enterprises obtain the components and manufacture Termos detergent themselves. For example, this is what the Murmansk shipyard does. The ships of the trawling fleet take Termos along to the distant shores of Africa so that they can repair their electrical machines in the ocean, without stopping their fishing. Other examples can also be given.

Why have they taken so long to organize industrial production of the Termos concentrate, even in small quantities?

However strange it may be, the extreme efficiency of the new preparation has partially begun to work against it. One ton of the detergent replaces 100 tons of benzine. One time the inventors tried to convince the director of a large Novosibirsk enterprise to go to the Gosplan and have them allot the necessary quantity of the detergent preparation. The director began to explain that it is inconvenient to go to the Gosplan for one ton, and that is precisely how much the enterprise needed. It would be a different thing to ask for 100 tons.

There should be a special discussion of the prices of the Termos preparation. Experimental batches of this preparation manufactured at the Dzerzhinsk plant for fatty alcohols was released at a price of 870 rubles per ton. Do not be confused by this price: in order to fully wash (under field conditions) a powerful diesel electric power station, it is enough to have 3 kilograms of

the preparation, from which one then prepares a 2-percent washing solution. But this price was obtained in Dzerzhinsk only with experimental production. How else does one explain that a substance costing 870 rubles per ton is obtained by mechanical mixing of the two components at a price of 350 rubles a ton each. When small batches of the preparation were produced at the Shebekino chemical combine, the secret of the tripling of the price by simply mixing the initial materials was lost or became out of date, and therefore the new price of Termos ended up to be 600 rubles a ton.

Commentary. Many have asked me the question why industry refuses to produce this effective detergent. Head engineers, technologists, masters and workers have all given the same answer: "the low price." It is not a solid answer, but a clear one. How much can a producer enterprise earn with insignificant volumes of an effective, but inexpensive product? Nothing. And the technology is also extremely simple--nothing can be squeezed out of it.

There is something reasonable in this statement. It can be developed. Why, for instance, should some organization that is responsible for scientific and technical progress not have a fund for increments to prices that is determined in such a way that effective innovations can be put into practice.

The low cost as an impediment to introduction can evoke two directions of thought. One: "oh, so would you not like to force everyone to gain an advantage." The other: "let's decide together what to do which will be advantageous for everyone." The proposal presented above is of the second kind. And the first kind leads to a blind alley, to explanations like: "oh, what a disgrace." One is made hopeful by the constant increase in the number of proponents of searching for mutual advantage, the only constructive way out of the situation that has arisen with respect to the Termos detergent preparation.

The enemy of the good is the best. We have now discovered a new and even more promising application of the detergents we have developed. It is known that in petroleum extraction a considerable part of the petroleum remains in the beds, when the deposit is considered to be used up. Throughout the world they are searching for ways of increasing the output of petroleum from the beds. One of the promising ones is to use the PAV solution instead of water for washing the petroleum out of the beds. This is now our main problem on the scientific plain. The concerns for industrial production of Termos and the failures are receding into the background. It is unfortunate, of course, that these detergents are still lost in the jungles of the two ministries.

Commentary. After the article went to press we learned that Soyuzglavkhim has allotted funds PAV necessary for manufacturing 20 tons of Termos concentrate in 1983. There is hope that the scientific production experiment will be continued for developing a technological process and the equipment necessary for mechanized cleaning of items with Termos detergent, with repeated utilization of the detergent in a closed cycle system, with regeneration of the solution and utilization of the wastes. It is necessary to develop nonstandard equipment in order to solve these technological problems. Who will take responsibility for this?

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ACADEMIC SOCIOLOGY, PRACTICAL SOCIOLOGY, SOCIAL PRACTICE DISCUSSED & CONTRASTED

Novosibirsk EKO: EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA in Russian No 3, Mar 83 (signed to press 26 Jan 83) pp 80-102

[Article by V. I. Gerchikov, candidate of economic sciences, and R. V. Ryvkina, doctor of economic sciences, Institute of Economics and Organization of Industrial Production of the Siberian Branch of the USSR Academy of Sciences (Novosibirsk): "The Sociological 'Triangle'"]

[Text] Increased production efficiency and the changeover of the national economy to the path of intensive development--this was designated as the most important economic and political task set by the 26th Party Congress for the next decade. In order to carry it out it will be necessary to improve all factors of the economy, including the main one--the social factor. Naturally, increased attention is being devoted to expanding the broad complex of social problems: improving the skills of workers and advancing the science of production, improving working conditions and health protection, reducing labor turnover and strengthening labor discipline, fighting against drunkenness and legal violations, educating the younger generation and so forth. From here follow all the increasingly complicated problems facing science, and, in our case, sociology.

The question is posed as follows. What are the interrelations between sociology and social practice? How can one increase the influence of science on resolving crucial social problems? We are speaking not simply about the coordinative pair "science--practice" but about a more complicated system. The fact is that in sociology as in certain other scientific disciplines two relatively independent areas have formed. One of them--we shall henceforth call it "academic" embraces research and development which is handled by collectives of academic institutes, faculties of social sciences and laboratories of VUZ's; the other one--"practical"--is formed and operates at enterprises, in organizations and in the sphere of branch and regional administration.

Thus academic sociology, practical sociology and social practice form a kind of triangle. Each of them has its own achievements and shortcomings, its own history and methods. To a certain degree one can already distinguish the specific features of the interrelations among the three partners, their mutual responsibilities and their complaints.

Let us try to look at the state of affairs in this "triangle," being oriented toward the final result--effective solutions to social problems.

Academic and Practical Sociology: Basic Achievements

The period of the establishment of academic sociology is the end of the 1950's and the beginning of the 1960's. The group of problems it studied was extremely narrow: labor turnover, migration of the population, selection of occupations, attitude toward labor, time budgets--these are perhaps the main things on which attention was concentrated. Research was impeded by the lack of development of a language, imperfect methods of gathering and processing information, and the lack of competent personnel and experience in drawing up programs. There were keen disputes about whether or not sociology needed mathematical methods and electronic computers, whether it was worthwhile to conduct questionnaires and so forth.

But now 20-25 years have passed. Academic sociology has won fairly solid positions. Its scientific center has been created--the Institute of Sociological Research (ISI AN SSSR). There are large departments of sociology in academic institutions of Moscow, Leningrad, Kiev, Minsk, Novosibirsk, Sverdlovsk, Tallinn and other cities. Autonomously financed sociological laboratories are in operation in the majority of VUZ's. The journal SOTSIOLOGICHESKIYYE ISSLEDOVANIYA has been published since 1974. Certain scientific research institutes and VUZ's have sociological specialization. Thousands of sociological research projects are carried out each year.

Fairly appreciable scientific results have been achieved. Sociologists now have fundamental concepts of the development of the city, the country, the production collective, the socialist way of life, the Soviet family, the social structure of the society, labor mobility, migration and so forth. Sociology has acquired methodological maturity: principles of a system approach have entered firmly into the work practice and research is being conducted according to specially developed methodological programs. Scientific collectives have been provided with tested methods of gathering, processing and analyzing data. There are approved systems of mathematical programs. Sociologists have learned not only to gather "their own" reliable information, but also to coordinate it with data from state statistics and documents of enterprises.

An important achievement of academic sociology is the changeover from "single-aspect," statistical research to dynamic research, to the study of changes. At the beginning of the 1960's when sociologists had no retrospective data they could describe the area of social life being studied only "at the time of the questionnaire." But now many scientific collectives have so-called "panels," that is, data that embrace periods of 5, 10, 15 and more years. Such, for example, is the research on attitudes toward labor (Leningrad), social development of rural areas (Novosibirsk), the way of life of urban workers (Moscow) and many others.

During the past 20 years sociology has become an extremely ramified area of science: it includes a multitude of various directions which in their totality involve almost all basic social processes. They have formed and are developing

sociology of the city and country, education, the family and consumption, the individual, production collectives, science, mass communications and culture.

Behind all of these results is yet another one: during the past years there has been a requalification of hundreds of specialists who previously worked in the areas of philosophy, economics, law, psychology, engineering specialties, mathematics, architecture and journalism. They have selected for themselves a new area of scientific labor--sociology, which has required of them a radical internal restructuring, the mastery of new methods and a new science of investigation.

Now about practical sociology. It appeared 15-17 years ago. Thus in 1979 the sociological services of the Leningrad Svetlana production association, the Perm telephone plant, and the Lvov Elektrona celebrated their 15th anniversary. With a difference of 1-2 years sociologists and psychologists appeared at enterprises of Dnepropetrovsk, Moscow, Sverdlovsk and a number of other cities. There are several thousand specialists working in industry now. In 1974 the USSR State Committee for Labor and Social Problems officially introduced these positions into the standard structures of enterprises. Several dozens of industrial sociologists in the country have a tenure of 8-10 years, and there are candidates of sciences among them. Branch sociological services have appeared and proved themselves fairly well. At the Perm telephone plant, for example, this service has been in operation for 15 years.

While during the first years of its existence, the small number of practical sociologists engaged almost exclusively in local research on a small group of problems (labor turnover, labor discipline, business and personal qualities of managers, and so forth) and participated in drawing up plans for social development, now they have more or less formed their position in the system of administration of the vital activity of production collectives.

True, there is still the position which is dying out of the sociological service in the role of "research and education," but there are also leaders who are trying to implement certain advanced ideas about the leading or equal role of the sociologist in the system of other services for administration of the enterprise. The best developed and representative position is the submission of practical recommendations and planning of measures for resolving a broad group of social problems on the basis of sociological research and analyzing statistical data of the enterprise, and also carrying out (developing and supervising the implementation) a plan for the social development of the collective.

What has practical sociology done up to the present time? Union wide recognition and extensive dissemination have been given to the Lvov Pul'sar system, the Dnepropetrovsk of Vnimanije, the Riga Serzhant system for selecting masters, the Perm system for stabilization of the labor collective (STK), and the Moscow (Krasnyy proletariy production association) system for special-purpose program control of the social development of the collective. They have developed all kinds of forms and types of occupational orientation of school children, a flexible work schedule (Kokhtla-Yarva), methods of certifying managers, developing self-administration in production brigades, collective responsibility for the condition of labor discipline, and so forth.

The system of stabilization of labor personnel (STK) developed by the Perm branch of the Center for Scientific Organization of Labor and Administration is widely known. It has been in effect at the Perm telephone plant since 1983. It was created for individual personnel work and includes procedures for hiring, placement and adaptation of personnel, intraplant transfers and prevention of turnover. All expenditures on its development and operation were recouped in 10 months, and even in the stage of experimental production, when it included only half of the annual volume of workers (in order to form experimental and control groups), the STK received a "passport" at more than 30 enterprises of various branches of industry.

Another example is functional music. The basis was laid for this 20 years ago by experiments in two shops of the telephone plant. Now there is a branch service which is in operation simultaneously at 30-40 enterprises. According to data that have repeatedly been confirmed, functional music provides for increasing labor productivity by 2-4 percent and reducing slipshod work by 6-8 percent. The ability to work increases, the negative consequences of monotonous labor on conveyors decrease, disturbances of the hearing organs decrease, labor turnover decreases and the general culture of the workers develops.

Practical sociology has created working models of methods and systems for solving a large group of social problems on the scale of an individual enterprise and (in certain areas) the branch of industry, and has developed a system of social planning and methods and forms of interaction between sociologists of enterprises and branches and other services (personnel, economic, technical).

Basic Difficulties

One of the essential shortcomings of academic sociology is the incompleteness of the research. For example, turnover and migration have been studied for many years now, but the legal aspects are still being extremely poorly accounted for. Sociological research on attitudes toward labor is not conjoined with the results obtained by economists. Until recently the sociological study of rural areas was conducted without accounting sufficiently for its connection with the city. Research on the way of life is poorly coordinated with the standard of living of individual groups of the population.

Another shortcoming is the poor effectiveness of the practical recommendations that are made. The majority of them are not made to anyone in particular and take the form of general wishes. Even in cases where the recommendations are submitted to the appropriate agencies, their results (that is, the possibility of introduction) are in almost no way determined. Frequently one does not even know if they were accepted by the management agencies or precisely how. Hence the practical aspect of the work of the academic sociologists--his recommendations--frequently assume an abstract nature. This, naturally, lowers the overall level of the results that are obtained.

In the autumn of 1981 a regular questionnaire was conducted on the kolkhozes and sovkhoses of Maslyaninskiy Rayon in Novosibirsk Oblast. The questionnaire, as usual, included a broad group of questions pertaining to the organization

of labor and the living conditions of the rural residents. But this time the people reacted to it in a quite unusual way: Instead of answers they themselves asked: "Why are you again asking us these same questions? We have already answered them for you and everything is the way it was. Why come to us if nothing is changing? ..."

All this is true. A year and five years ago as today the machine operators and animal husbandry workers were complaining about overloading, the shortage of spare parts, the poor quality of the technical equipment and shortcomings in management. Even if profound positive changes are taking place in rural areas, the stability of certain negative phenomena give rise to a feeling of the uselessness of many efforts, and primarily the work of sociologists. What is the real return from the questionnaires and recommendations which are given to practice from year to year? The leading sociologists of the scientific research institutes and VUZ's say that the return is minimal.

Academic sociology is not sufficiently directed toward the most critical social problems. Frequently its attention is concentrated on problems that are less crucial or peripheral. Dozens of large research projects have been devoted to various aspects of the way of life, but such constituents of it such as drunkenness and alcoholism are not properly studied by the sociologists of academic collectives.

Another example is the lack of the necessary concepts and categories, an information base, and methods of gathering data for studying certain negative tendencies in the sphere of public production (theft, writing off items, and so forth).

There are several reasons for the aforementioned shortcomings. And probably the main one is the poor utilization of sociology as an instrument for solving social problems related to the country's development which are manifested primarily in the fact that sociologists practically never have to develop social plans (programs) directed toward changing the existing forms of the development of the most important subsystems of the society. The majority of changes, for example, in the sphere of culture, public health, education and so forth, take place without their participation. Sociological collectives of scientific research institutes and VUZ's most frequently do not have permanent clients in central and territorial administrative agencies. The ties between sociologists and these agencies are episodic in nature, being activated only during periods of one "campaign" or another. The functions of the academic sociologist are not clearly delineated and they have not arranged contacts with practical sociologists.

There are many problems in practical sociology as well. Let us begin with the fact that sociological services are created far from everywhere, and they simply do not exist at many enterprises. Practical sociologists are not especially trained. There is a lack of determination of the position and responsibility of these specialists at the enterprise, which leads to their constant enlistment in random, "burning" issues. Many recommendations are not realized in practice and the activity of the sociologist frequently amounts to proving the usefulness of the research they conduct. Hence one can understand the frequent replacement of this group of sociologists.

There are also many difficulties of a purely scientific nature. The main one of these (this is constantly being discussed at all conferences) is the lack of methods for adaptation to applied operational research which would make it possible to obtain substantiated resolutions to real social problems. Practical sociologists are stewing in their own juice because they are not obtaining the necessary scientific assistance. This is precisely why they are frequently incapable of responding to the needs of the enterprise which, naturally, reduces their prestige in the collective. The practical sociologist is between a rock and a hard place: between science and the enterprise itself. And the two sides have absolutely different demands. In order to have importance in the eyes of science, the practical sociologist must provide theoretical substantiation and statistical representativeness of his research, apply modern methods, electronic computers and so forth. Without this today it is impossible even to publish their results. But in order to obtain approval on the part of the management of the enterprise, another thing is required--efficiency, concreteness and practicability of recommendations.

Of course one cannot avoid a certain amount of contradiction in the requirements made on the practical sociologist. But there are a number of factors whose elimination would essentially ease his situation. First of all many enterprises are not at all interested in efficiently utilizing their specialists on social problems or obtaining a real return from them. Here are manifested certain shortcomings in the economic mechanism that reduce the enterprises' possibilities of solving these problems. Hence the lack of development of "sociological vision" on the part of many managers of enterprises, which impedes mutual understanding between them and the sociologists.

The results of the work of the applied sociologist are also affected by the fact that such a sphere of activity as the realization of the results of scientific research in practice has still not become a subject for scientific development. Each sociologist himself must be responsible for questions of the technology of introduction, because he does not receive general methodological support from academic sociology.

Social Practice and Its Ties With Sociology

In order to clarify the interrelations between social practice and sociology it is important to single out two of its main levels: general and local. The general level involves problems whose solutions are within the competence of many administrative agencies, primarily central ones. Such, for example, is the problem of communist education. The local level of practice embraces those and only those problems which can be resolved on the scale of a given territory, branch or individual enterprise.

What does local practice expect from sociological science? According to our observations, two results. The first--concrete recommendations for achieving certain social goals. Say, to ensure increased labor productivity as a result of social factors; to improve the attitude of members of the collective toward labor; to develop their social activity; to increase production discipline; to reduce labor turnover and illness, and so forth. The second result is authoritative scientific substantiation of "their own disastrous situation" in order to obtain from higher agencies additional funds, resources, benefits or indulgences.

Incidentally, fairly frequently the basic advantage to the client is provided by precisely the second result: they have spent 50,000-100,000 rubles on an economic agreement, obtained a scientific report with authoritative signatures, placed it on the minister's desk and received 5-10 million rubles in additional capital investments. Although it is not acceptable to write about this since we are speaking about the extensive path to resolving social problems. Nonetheless if one estimates the effectiveness of sociology not in terms of the momentary improvement of the state of affairs but in comparison with the possible deterioration of the situation in the forthcoming period, it is necessary to take both results into account.

Have the requirements for the practical worker changed during the past 15-20 years? Undoubtedly. During this period it has changed from experimental attempts to solve certain social problems to planned control of the social development of collectives and coordinated actions on the scale of the city and even the republic. Therefore requirements on the quality and substantiation of the recommendations produced by science have increased. The effect that can be produced by partial solutions that lie on the surface has already been realized. Many recommendations have been approved and evaluated. Old forms and methods of interrelations between sociological science and social practice have turned out to be ineffective. A decade and a half ago, in order to solve the problem of labor turnover it was enough to invite VUZ sociologists to the plant, who could see and suggest a great deal. Then it was enough to give recommendations like: "improve working conditions," "improve the distribution of housing," "raise . . . ," "reduce . . . ," and so forth. Now one must speak not about what needs to be increased or improved, but about what to do. Decisions must be concrete, specific and work in the accepted administrative rhythm, using the existing administrative procedures and document circulation.

Unfortunately, academic sociology far from always recognizes the changes that have taken place in social practice and is not always ready for them.

At the same time it is precisely practice that is primarily guilty for the poor utilization of sociology since it makes decisions without preliminary sociological developments. During recent years much has been said and written about the inadequate independence of managers in adopting economic decisions. But so far not enough attention is being devoted to the fact that economic independence makes the manager indifferent to the introduction of scientific, including sociological, recommendations. One usually hears: "We will still have to introduce it and not you, and we can hardly keep up with the plan. When do we have time to deal with the introduction of your recommendations!" And there follows a mass of examples showing how for him, the manager of the enterprise, it is difficult to achieve the most necessary actions related to the development of production, its material support, construction, and so forth.

How should activity be organized in the sociological "triangle" under consideration so that the return from sociology to practice increases essentially?

The Creation of a Sociological Service

Effective, purposive and planned solutions to social problems cannot be arranged without the development of an "all-around" sociological service that embraces all spheres and all levels of the national economic structure.

Sociological subdivisions are needed not only by industrial and construction collectives, but also by enterprises, institutions and organizations of transportation, communications, agriculture, trade, domestic services, culture and education. The city and rural region as well as territorial and branch planning agencies need their own sociological services. Is it possible to do without this? Perhaps one can later enlist academic science, including VUZ science, to solve local social problems? Alas, there is no other way.

It is no accident that the developments that are most fully realized in practice are those carried out by sociologists of enterprises or branch services. In the first place, the main criterion for evaluating the work of the applied sociological laboratory is the fulfillment of certain functions for "administration of social practice," that is, the social development of the plant, branch, city or other object. This alone directs the sociologist toward obtaining an effective solution. In the second place, the resolution to the majority of social problems even in local practice requires a comprehensive approach which cannot be provided by any academic fundamental research. Thus in order to reduce labor turnover, it is necessary to change almost all elements of the worker's production and nonproduction environment. Turnover depends on production technology, labor organization, payment for labor, work with personnel, the provision of housing and many other things which involve practically all the main services of the enterprise. And theoretical sociology works, as a rule, within the framework of particular scientific areas, each of which is incapable of providing this comprehensiveness. It is easier for the sociological service of an enterprise to overcome interdisciplinary separation and, on behalf of the enterprise, it can invite specialists of various profiles--engineers, physicians, lawyers, pedagogues, psychologists, economists, cultural workers and so forth. Moreover, many of the required specialists are available at the enterprise itself and are under the jurisdiction of the manager.

In the third place, the practical sociologist, because of his being directly at the enterprise, can more easily take into account "feedback" from the initial results of the research, refine the programs, augment insufficient data and gather newly required data, and expand the group of problems that are studied. Through the efforts of the client (say, the plant) he is capable of carrying out an experimental implementation of his recommendations and suggestions and checking their effect.

Finally, effective realization of the recommendations is possible if their proposed solution is well included into the existing system of administration. Therefore there is no doubt that it is necessary to have a profound knowledge of this system, to know it, as it were, from top to bottom. It is necessary to have not an approximate or a general, but a precise idea of the functions of various services of the enterprise, the tasks of the subdivisions, the methods of their operation, the peculiarities of the formation and passage of information and the existing administrative mechanisms. It is hardly reasonable to require this kind of knowledge from academic science. But otherwise one cannot provide for clear direction of recommendations, coordination of proposed engineering decisions with established elements of the administrative structure, sufficient information support for decisions or efficiency.

It is thus obvious that sociological services could do a great deal. But so far they exist in less than 10 percent of the industrial enterprises and associations, in only 15-20 percent of the ministries and departments, in several rayons and cities, and as part of the planning agencies of certain oblasts and republics. Nothing can justify the situation that has arisen in rural areas and in the agro-industrial complex. There is no sociological service of any kind on the farms studied by our institute. Agricultural enterprises have still not looked the applied sociologists in the eye as they have Sel'khoztekhnika associations, procurement organizations and processing enterprises.

Thus academic science is placed in an extremely difficult position: it does not receive "social orders" from the enterprises, it cannot rely on applied sociologists and it must partially fulfill its own functions. Moreover, agricultural enterprises are absolutely not prepared for sociological research, for nobody is gathering the information necessary for this. There are no data about idle time of technical equipment and workers, about the effectiveness of punitive and incentive measures that are applied, about the effectiveness of various forms of payment for labor, and so forth.

What does academic science do in this situation? Without a chance to gather the necessary data it must engage not only in that which the applied sociologist should do, but also in that which should be done by personnel, labor and wages divisions and other services of the enterprise. The following situation arises: There is an intelligent, young, talented manager who is ready to carry out serious innovations. He turns to sociologists with complete faith that with their help he will solve his problems, and he discovers that sociology is beginning to "skid": the enterprise does not have the necessary information, the sociologists, of course, cannot arrange calculations without assistance from the enterprise, there is nobody handling this at the enterprise, and the conclusions are needed today. It is not surprising that sincere interest in sociology is gradually decreasing and disappearing.

It is unrealistic to speak now about creating a sociological service at each agricultural enterprise. Moreover, the social problems here are not only of a production, but also of a territorial (village) nature, and, moreover, the other partners of the agricultural enterprises in the agro-industrial complex do not have sociologists either. It is utopian to think of completely supplying all production and territorial facilities with sociologists in the near future. It is more efficient to have sociological services as part of the rayon agro-industrial associations that are created in keeping with the decree of the CPSU Central Committee and the USSR Council of Ministers, "On Improving the Administration of Agriculture and Other Branches of the Agro-Industrial Complex."

The role of territorial (city, oblast, kray) sociological services could be fulfilled both by sociologists in planning agencies and by sociological laboratories of polytechnical and economic VUZ's. But in the latter case it is necessary to have laboratories for providing data and to provide them with financing on the basis of long-term economic agreements between the territorial agencies and the scientific research sectors of the VUZ's.

Not only local, but also unionwide practice needs a sociological service. There are many problems of a systemic nature. Such are the way of life, the attitude toward labor, the formation and decline of families, the development of cities and villages, the change in the type of individual, antisocial behavior and so forth. Regulation of these processes requires study of all factors, including sociopolitical, economic, demographic, migratory, psychological, legal, domestic and so forth. For example, the solution to the problem of alcoholism and drunkenness presupposes a complex of measures that pertain to the structure of retail commodity turnover, income of the population, the health condition, ways of spending nonworking time, administrative and legal forms of regulating antisocial behavior, methods of anti-alcoholic education, and so forth. Economists, lawyers, pedagogues, psychologists, physicians, trade workers and other specialists should work in close integration with sociologists.

The development of system recommendations pertaining to phenomena that are originating in a multitude of subsystems of the society are accessible only to academic sociology, for it is necessary to have profound ideas about the structure and patterns of development of the society as a whole. Academic sociology in close interaction with state and regional administrative agencies should fulfill the functions of the sociological service of the upper level, solving general social problems of the near and distant future.

Sociological Personnel and Sociological Education

In order to create a sociological service it is necessary to have personnel who are specialists in applied sociology. In addition to general sociological disciplines they need knowledge of applied sociology in their future specialization (sociology of industry, transportation, construction, rural areas, cities, culture, trade and so forth), technology and organization of the corresponding production, economics and scientific organization of labor, organization of personnel work, the document turnover of the enterprise, questions of planning and administration, methods of operational analysis of data, the drawing up of mathematical problems, and a number of other kinds of knowledge and skills. This set of disciplines corresponds most of all (except for purely sociological programs) to programs of economics departments of profile VUZ's (technical, construction, transportation, trade and so forth). Here it is most expedient, in our opinion, to develop an applied sociology specialization.

Although the problem of training sociological personnel has been under consideration (and very intensively) for about 15 years now, the negative position of the USSR Ministry of VUZ's remains unbending, and only because of the immense efforts of enthusiasts during the past 5-7 years have we graduated 50-70 economists and philosophers who have received a certain amount of sociological training at universities in Moscow, Leningrad, Minsk, Novosibirsk, Riga, Tallinn, Sverdlovsk and two or three other VUZ's of the country. It is not surprising that, according to questionnaires of sociologists of the three most "sociological" ministries (the Ministry of the Ship Building Industry, the Ministry of the Communications Equipment Industry, and the Ministry of the Electrical Equipment Industry), the proportion of specialists trained in universities hardly reaches 1 percent of the number of all workers today in the sociological services of the

aforementioned branches. The proportion of people in the most similar specialties (philosophy, economics, psychology) does not exceed 25-30 percent; up to 20-25 percent of the sociologists are people with technical or legal education, and the rest of them are philologists, historians, pedagogues and so forth.

Even the aforementioned 50-70 sociologists who are annually graduated by universities are not prepared for work in the sphere of practical sociology since it is the task of universities to train personnel for science and the higher school. The training programs are directed toward this. The teachers also came from academic sociology and so there are few practical sociologists among them. As a result, the graduate (who has not received an assignment to science or a VUZ laboratory), coming to the plant with his "university" view of sociology, ends up being a "rara avis" in the system of administration of the enterprise. The administration can do one of two things: either "retrain" the sociologist who is oriented toward science into an "applied sociologist," which takes a long time and is difficult, or they can go through two or three years of suffering and then--"go wherever you want to as long as it is to science!" Where the principles of activity correspond more to the training he has received in the VUZ.

But this is still not all. In the second case the enterprise, having lost the sociologist, usually refrains from further "experiment" and the USSR Ministry of VUZ's is again confirmed in its unshakeable position that there is no need for sociologists and it is not necessary to introduce a new specialty. In the former case (much rarer) the sociologist fairly quickly accumulates research and practical material, receives recognition at the enterprise, becomes a skilled specialist in the sphere of applied sociology and could make no small contribution to engineering and theoretical sociology (through publication in scientific journals) and also to training future applied sociologists (when he is enlisted into teaching). But here his possibilities are sharply limited: there are no special journals for applied sociology (moreover, so far they have not even developed standards or generally acceptable requirements for this kind of publication), and access to scientific journals is significantly more difficult for practical sociologists. He is faced with considerably more difficulties when preparing a dissertation than his colleagues who are working in science and the higher school; and without this he will not be enlisted for teaching and nothing will confirm his qualifications in the eyes of the engineering and scientific personnel of the enterprise. Incidentally, it is not inappropriate to note that to obtain a scholarly degree is practically the only way an applied sociologist can increase his wages since the possibilities of advancing in the job structure are very small.

The circle is closed. Actions are needed in order to open it up.

In the first place it would be extremely useful to organize in Moscow, Leningrad, Novosibirsk, Kiev, Minsk and a number of other sociological centers 2-3-month courses for specialists in branch and sub-branch sociological services; to create 1-year courses in applied sociology for people with higher economic or technical education who are sent to the courses by the enterprises and organizations; to introduce half-year temporary duty for managers and specialists of sociological services of associations, enterprises and branches in order for them to prepare scientific publications and subsequently register for graduate school or for scholarly competition.

In the second place, it is absolutely necessary to expand the possibilities of publishing work on applied sociology in existing publications, and also to organize the output of special publications, including periodical collections under the aegis of the Soviet Sociological Association of the USSR Academy of Sciences.

In the third place, it is becoming increasingly meaningful to expand the number of specialized scientific councils in the specialties "Economics and Scientific Organization of Labor" and "Applied Sociology." Incidentally, in dissertations on "Applied Sociology" it would be good to increase the significance of the practical "applied" part of the work.

In order to develop the overall system of sociological education and increase the qualifications of sociological personnel, to us it seems necessary to introduce the specialty "applied sociology" in all economic departments of universities and profile VUZ's; to provide for the preparation and publication of textbooks and methodological aids in applied sociological disciplines; to expand the possibilities of temporary duty for applied sociologists, course students and graduates at enterprises and in organizations that have developed and certified sociological services; to develop a periodic system of courses, schools and practical training seminars on the branch and territorial principle, on the basis of organization (houses) of scientific and technical propaganda (DNTP) and political education (DPP); and to introduce teaching of applied sociology for students of the third-fourth classes in all specialties of economic, technical and other profile VUZ's, enlisting skilled practical sociologists for this.

Interaction In The Sociological "Triangle"

Let us discuss first of all the interactions between the two sociologies--academic and practical. The usefulness of this interaction is determined by what they can give one another within the framework of the sociological "triangle" under consideration.

Academic sociology is called upon to perform three functions with respect to practical sociology: scientific, organizational and methodological. It must provide applied sociologists with methods of investigating such problems as labor turnover, migration, labor discipline, the formation of the collective and so forth. The practical workers must find in the methods a survey of the most important results obtained regarding the given problem in the country, a survey of the methods applied for gathering, processing and analyzing data, an analysis of typical mistakes that arise when conducting research on the subject, and bibliographical information concerning it.

Even more important for practical sociology are theoretical developments which would set the goals and orientation points for further development of social practice and for control of various kinds of social processes. It is precisely academic science that must provide generalizing work which will show the tendencies of changes taking place in the society: its social structure, socio-economic differentiation, processes of mobility, attitudes toward labor, participation in administration, the dynamics of the level of education and skills, and so forth.

There is no doubt that academic sociology is called upon to render significant assistance in improving the skills and training personnel for the country's sociological service. It is responsible for the task of purposive education of applied sociologists with higher qualifications who are capable not only of solving complicated problems in the sphere of social practice, but also providing for "expanded reproduction" of the entire practice of sociology. Its functions include the organization of joint work for creating training and methodological aids, developing programs and courses of lectures, and conducting schools and seminars.

What can practical sociology give theoretical sociology in exchange? Of course, it can generalize and submit to academic science the problems that originate in practice; enrich science with the results of applied research and solutions tested by standards; help it in practical verification of theoretical propositions and hypotheses; serve as a support for the development of entire social projects and programs which academic science sends to practice; and deliver to science and the higher school personnel who are enriched with work experience as part of the sociological service of the country.

In order to organize the interaction between academic and practical sociology, apparently, it is necessary to form several coordination centers in the country --under the Soviet Sociological Association of the USSR Academy of Sciences and the leading scientific research institutes and VUZ's. In particular, in our institute it would be expedient to create a center for coordinating the work of theoretical and practical workers in the area of industrial sociology.

The second aspect of the issue is the interaction of both sociology and social practice with party, state and economic administrative agencies. The main form of work of these agencies in which science also participates is the preparation and output of directive, normative and methodological documents that determine the directions, concrete tasks and ways of solving the multifaceted social problems. Unfortunately, as was already said, the methodological art of organizing their development is very frequently far from meeting modern requirements.

For example, methods are being created for planning social development for the level of the enterprise (association). Initially the various plans are developed by the corresponding scientific subdivisions under the Gosplan, the USSR State Committee for Labor and Social Problems and the AUCCTU. Then there is a lengthy procedure of coordination among these same agencies. After this the plan of methods is sent to the various ministries. Within 3-4 months several responses are gathered and somebody (frequently not the most important person) completes the development and conducts a so-called "confirmation" of the methods at several enterprises. As a result, the development takes 3-4 years and the practical and methodological experience accumulated during 15 years by sociological services of enterprises and branches remains unused. What is left for these services to do? Either they can conceal their developments until the time is right and, with every justification for skepticism, work according to imperfect methods which, however, are distributed from above, or, with immense difficulties, they can assert their own methods (submitting them for "completion of development at the unionwide level, taking specific local features into account"), and use the unionwide methods purely formally, for reporting.

A considerably more efficient alternative--both from the standpoint of reducing the time periods for development and improving its quality--would be to create a working group for various subjects. Leading specialists who represent all three corners of the "triangle" would be sent to the head developer for temporary duty. All the principle theoretical and methodological issues could be studied through well-known methods of collective work, and the purely methodological and technical work, coordination and approval would be clearly divided among the participants.

A situation similar to the one mentioned can be found in the interrelations of several administrative agencies of the upper level with academic science. Many scientific collectives are enlisted in preparing solutions, but their contribution frequently ends up to be minimal. Why? Because academic science does not present a substantiated concept that is unified from all standpoints (for example, regarding such issues as equalizing the conditions of the city and the country, eliminating unskilled manual labor and so forth). It does not present this because it does not conduct systematic development of the concepts that are oriented toward practice. As a result, in carrying out orders from the corresponding agencies, it mechanically combines various predictions, calculations and descriptions made at various times which have various goals and are not coordinated among themselves.

In order to increase the return from academic sociology, it would also be expedient to expand the practice of creating permanent special-problem groups which join together within the framework of a particular social problem all developments and decisions of specialists that are necessary for it. Problem scientific councils of the USSR Academy of Sciences and the State Committee for Science and Technology and also specialized councils created in connection with the development of the Comprehensive Program for the Scientific and Technical and Social Development of the Country are such groups.

In terms of its functions in society and also in terms of the scientific support that sociology has today (Marxist-Leninist methodology, the system approach, mathematical software, computer equipment and so forth) it not only should, but is quite capable of being useful to society to a much greater degree than today. But in order for its scientific potential to be utilized fully it is necessary to solve a whole complex of interconnected problems. Many efforts in their movement toward one another are required of participants in the sociological "triangle." This article was written in order to clarify this indispensable condition.

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PERSONAL COMMITMENT RESULTS FROM AGREEING ON DECISIONS

Novosibirsk EKO: EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA in Russian No 3, Mar 83 (signed to press 26 Jan 83) pp 102-108

[Article by A. S. Sheshnev, chief of the TsNIPR of the Tatneft' Production Association (Almet'yevsk): "Coordination of Decisions and Personal Interest"]

[Text] Remember: for frequently orders, instructions and plans of measures seemed to you to be impossible, unrealistic, or even absurd. These feelings arise when administrative decisions are made without your agreement or in spite of your opinion. Overt or covert opposition arising from a feeling of wounded pride are known as a kind of psychological barrier which it is always easier to avoid than overcome.

Let us stipulate at the outset that there are many decisions that do not require the agreement of the people who are to carry them out. Any administrator knows this and this is not what the article is about. Let us discuss those decisions which are ineffective only because the people who are to carry them out give them a hostile reception, or these decisions are made for them without their agreement.

In the majority of cases psychological difficulties in implementing decisions are the result of an underestimation of the stage of coordination. Coordination performs important social and technological functions in administration: it familiarizes the worker with the matter he is to carry out, it augments the decision with available information, it transfers to the worker special information of the "know-how" type and, the main thing, it provides for agreement about the practical implementation of the decision. Since agreement cannot be reached without negotiations, coordination is almost always a compromise which requires refinements in the positions of the parties or mutual concessions. Here the divergence of the opinions of the manager and worker is determined by the difference in the approach to the problem under consideration.

Depending on the final results of the coordination, one can give the following situations:

- 1) complete agreement as a result of mutually refining positions;

- 2) partial agreement with preference given to the position of the worker;
- 3) partial agreement with preference given to the position of the manager;
- 4) agreement is not reached and the decision is made by the manager without the agreement of the worker.

It is obvious that the first situation is preferable. The question arises: why in the production activity of the enterprises is it found considerably less frequently than the clearly prevalent third and especially the fourth situations? This is frequently explained by the shortage of time for coordination or by the fact that an obvious camouflage was used, based on replacing the worker with his supervisors (section chief, head specialist), and the procedures of coordination amount to familiarization with a decision that has already been made. The use of "consoling" conclusions does not make the decision more coordinated or its implementation more efficient.

Let us assume arbitrarily that the decision that was made was the only correct one. But does this mean that the worker will back down and carry it out precisely? Of course not. He practically always has the opportunity of questioning a decision because of its lack of correspondence to one specific condition or another and finding half measures that reduce the effectiveness of the intention to zero. Managers are well aware of this. And frequently their desire to avoid coordination is only a result of many factors of a psychological, organizational and economic nature. It is worth mentioning several of these factors.

The first is poor awareness on the part of the manager of the peculiarities of the psychological reaction of the person who is placed in some new conditions because of the decision that has been made, who must make new efforts, who must have, perhaps, new knowledge and so forth. How does he behave when he hears about a decision from the management? It is better not to take the risk, but just give the order and let him carry it out

Another factor is the inadequate competence of some managers, which is related to the quality of their occupational training, the organization of their labor and the imperfection of the administrative process itself. Frequently managers must make decisions under rushed conditions, using intuitive estimates of the condition of the objects of administration, with poor reliability of communications with the surrounding environment. Under these conditions the quality of the decisions that are made is not always high, and in order to avoid accusations of incompetence, such a manager is more willing to turn to orders and decrees.

Finally, among these factors is the steady orientation of managers toward stable operation of the objects under their control and not toward innovative decisions. Therefore the decisions that are made are mainly cautious and support the existing policy, even if it is not very effective. Because of their simplicity and the fact that they are repeated, these decisions also require careful coordination.

To reveal and analyze these factors is an independent and complicated area of research and improvement of the process of making administrative decisions.

We shall consider the psychological aspect of the problem of coordination in terms of the answer to the question: "how and in what direction does the position of the manager change depending on the role he is to play in the processes of making administrative decisions?"

In the sphere of production the manager simultaneously fulfills the role of a subordinate and a superior. He must constantly adjust his attitudes, demands and behavior, depending on the role and situation he is in at a specific moment in time: at a board meeting or in his office, when he is speaking with his superior or with a subordinate

One can easily be convinced that the problem of dual requirements on himself and on his subordinates actually exists by answering the following questions.

What would we choose for ourselves?

Working conditions. A normed working day with a daily assignment or a working day without a norm and a monthly plan?

Control conditions. Daily control of the results of the work of each shift or episodic, selective control?

The number of control indicators of labor. From 4 to 7 or more, as in the KS UKP, or 1 to 3, which evaluate only the most important results of the work?

Of course we would select the latter variants for ourselves. But for our subordinates? More likely the former ones or something close to them. Why? Traditional explanations are: "they need more rigid control, one must keep an eye on them, they have greater losses of working time and less motivation to work" The principle of limited confidence is at work. We receive the same picture if we continue the list of indicators that determine the conditions for the organization of labor.

We conducted research in order to evaluate more precisely the personal interest factor. Students in one of the classes of the party and economic activity of the University of Marxism-Leninism in Almet'yevsk filled out a questionnaire entitled "I select conditions for the organization of my labor."

The questionnaire contained ten questions (see table). For each of the questions there was a set of answers that were distributed in terms of diminishing rigidity. Those who were questioned were asked to evaluate the acceptability "for themselves" of each of the answers on a 5-point scale.

A total of 45 people were questioned, including 16 managers of enterprises, shop chiefs and division chiefs, 18 masters, technologists and section chiefs, and 11 engineers, teachers, physicians and trade workers. All of the students had administrative service of more than 3 years and from 6 to 2,000 subordinates.

Table. Results of Questionnaire "I Select Working Conditions for Myself and My Subordinates" (rated on a 5-point scale)

Indicators	Conditions of labor organization with maximum direct and reverse evaluations of preference:	For self For subordinates	
Working schedule	Unnormed work day with permanent schedule and plan for month	4,1	2,8
	Normed work day with daily assignments	2,9	4,2
Control schedule	Episodic, selective	3,6	2,7
	Daily, from results of work of each shift.	3,5	4,1
Number of indicators for evaluation of labor	From 1 to 3, evaluating the most important results of labor	4,1	3,5
	From 4 to 7, evaluating the main results of labor	3,6	4,2
Periods for evaluating labor	Monthly	4,1	3,5
	Each shift	2,9	3,9

Display of attention from manager	Episodic, in terms of especially positive and negative deviations in results of labor.	3,8	3,1
	Regular, in terms of stages of work each week and each day.	3,6	4,1
Nature of relations with manager	Friendly, not limited to job matters	3,9	4,1
	Formal and courteous, limited to job matters	2,7	2,6
Style of management	Democratic, allowing discussion of production and social issues	4,6	4,5
	Directive, requiring unwavering fulfillment of manager's instructions	1,4	1,3
Form of payment for labor	Piece-rate plus bonus.	3,9	3,7
	Under contract	3,3	3,9
Bonus system	According to results of personal work	4,0	3,7
	According to results of work of primary collective	4,0	4,2
Attention of social organization to issues in private life	To education and behavior of children in school, family relations	2,8	3,5
	To creative activity, forms of leisure	3,5	4,1

Scale of evaluations

After 6 months, when the preceding questionnaire was safely forgotten, these same people were again questioned on the questionnaire "I choose working conditions for my subordinates," and the questions were the same. The results are presented in the table.

From the data that have been presented it follows that the answers to all 10 questions of labor organization from people holding management positions corresponds to the role they fill. Therefore the influence of personal interest on the quality of administrative decisions is analogous to the influence of the systematic error.

Returning to the situations considered above when coordinating decisions, one can draw the following conclusions:

with complete agreement, personal interest has minimum significance;

in the second situation, where agreement was reached, but preference was given to the position of the worker, the decision in terms of the expectations of the manager dropped by 10-30 percent;

in the third situation the decision increased by 10-30 percent with respect to the expectations of the worker;

in the fourth situation there was an even greater increase in norms and requirements with respect to the expectations of the worker. It is precisely here that the difficulties in carrying out the decision are most probable.

It is very important to know the influence of personal interest on the preparation, coordination and adoption of decisions. One can restructure the organization of the conferences, change the selection of alternative decisions proposed by the workers and one's own strategy for coordinating decisions, develop measures that neutralize the negative effect of personal interest, and so forth.

Personal interest is one of the objective features of the personality of the manager and it must be taken into account when selecting personnel and planning the technology of the process of decision making. One of the side results of the research can be the confirmation of the already known conclusion about the causes of the poor effectiveness of the structures of administration which rely on orders and decrees, strict regulation of people's behavior, the conveyor, piece-rate payment, incentives with fines, and so forth. All these measures stand in contradiction to the people's desire to increase the degree of their freedom, both in working conditions and in methods of control and relations with the management.

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LEADERSHIP STYLE, BEHAVIOR EVALUATED

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[Article by G. A. Kulagin: "Directors' Daily Life" Conclusion. For beginning see EKO, 1983, Nos 1, 2]

[Text] The Director and the Future of the Enterprise

Of course the main demand placed on the manager of an enterprise always has been and always will be to fulfill the program--monthly, quarterly and annual. All he has to do is "fail" with the plan and he immediately ceases to be responsible to the board of the ministry or the bureau of the raykom. But still I shall express what is possibly a questionable thought: a good director should devote as little time as possible to questions of the fulfillment of current plans and as much time as possible to the future development of his enterprise. The way is done has been discussed in preceding articles. Let us recall briefly the means of achieving this goal:

good development and "boiling down" of the plan in the stage of formation;

constant concern for maintaining the number of production workers at the calculated level;

an efficient structure of the staff;

an economical and well-thought-out system of information about the course of production;

the selection of efficient deputies and chiefs of shops and divisions.

If all of the aforementioned issues are resolved satisfactorily, the director can and should free himself of direct leadership of the course of current production. Sometimes, true, it is necessary to exert additional efforts and break down a kind of psychological barrier, directly forbidding subordinates to come with, for example, complaints like this: the transportation shop has still not sent a vehicle; the forging shop has only produced 10 forgings and 30 are needed; the chief of the division for technical control does not wish to assign controllers to the night shift, and so forth. To this end, I immediately took the dispatcher panel out of my office and, along with the

Moscow and city telephones, left only one internal telephone, and they could call me on this only through the secretary. At first they did not like this at all. Some people accused the new director of bureaucratism and conceit. But then they got used to it and for 10 years in a row the association fulfilled its current plans without a single failure and won banners in the competition, although I repeatedly ignored details and did not know how to handle the machines. My deputies handled current tasks and did it fairly well. I had complete confidence in them and checked on them mainly through system information which came in regularly.

What are the main long-range issues to which any director should try to give maximum attention and most of his working time? In my opinion, there are three:

developing a technical policy for the enterprise, that is, determining the products for whose output one must prepare;

updating internal production capital and preparing it for assimilating new products;

showing concern for augmenting and reinforcing personnel, primarily workers, and hence showing concern for the social development of the collective.

Let us discuss the first two issues. First of all I should state quite categorically that an industrial enterprise that does not have its own developers is not a full-fledged enterprise and its director is not a real director, for he cannot bear responsibility for the future of the matter entrusted to him. All of world practice demonstrates this.

A plant which operates according to documentation that is developed by independent scientific research institutes and design bureaus cannot be responsible either for the quality of its products or for their technical level. From my point of view it is very sad that the corresponding decisions directed toward eliminating the unnatural schism between applied science and engineering developments, on the one hand, and production, on the other, are still being slowly implemented. Sometimes one hears the following objection from opponents of joining developers and production workers into unified economic complexes: this cannot be done because the director will be crowded out by the developers, they will devote their work to the needs of the present day and they will impede technical progress. There is nothing erroneous in considerations like these: it is precisely when the director is not responsible for the development of innovations that he impedes their assimilation, justifying this by the frequent mistakes and incomplete developments in the plans that are received from "outside." But if he is given full responsibility for the level of the products produced by the enterprise he will have nowhere to turn. Finally, a stupid director who does not understand the significance of new technical equipment can always be fired. Our practice shows that there are not so many of these stupid people and that enterprises that have their own institutes and design bureaus, as a rule, hold leading positions in the area of new technical equipment as well. It is sufficient to refer to the experience of the Leningrad Experimental Mechanics Association

imeni V. I. Lenin, the experience of Electrosila and also the successes in assimilating modern processing centers at the Ivanovo association for boring machines, about which EKO readers have been informed in detail.

And so let us discuss the role of the director in determining the technical policy under normal conditions, that is, when he is directly in charge of the design organization or when he can exert a decisive influence on it in one way or another. It would seem that when there is a head designer and a head engineer there is no need for direct intervention on the part of the director in the activity of the developers, the more so since in terms of his competence and the depths of his purely technical knowledge, he is not able to compete with the two aforementioned figures. Of course this is not so. The director cannot and is not obligated to know, for instance, which facing for a guide is more advantageous today: plastic or bronze? Which is better: hydrostatics or roller bearings? Which is better for a given machine: drive with direct or alternating current? Which particular system of numerical program control is expedient? All these and similar questions can and should be resolved by specialists with a narrow range of knowledge. But the director is obligated to know the tendencies in the development of world technical equipment in the area in which the enterprise operates. And he must not only know it, but also have his own opinion. He should clearly understand the demands of the consumer and correctly evaluate arrangement decisions, size series, probable production outlays for a new machine, conditions for its assimilation and the expected sales.

The future of the enterprise lies in predicting such questions. Naturally, it is far from simple to make a correct prediction and determine the technical policy on the basis of it. One must follow foreign innovations, read specialized periodical literature, visit exhibitions, enlist experts from outside, think a lot and understand that even with all this there is no 100-percent guarantee that the technical policy will be determined correctly. But strange as it may be, regarding these issues a thoughtful director makes fewer mistakes than a narrow specialist who has gone through a certain school and is limited to customary decisions in his thinking. This is especially true when it comes to sharp changes, of which there are now so many in the development of technical equipment. Nor can one forget that prompt preparation of the shop for production, the discovery of the need for one kind of renovation or another, and the provision of the enterprise with unique new equipment depend on decisions in the area of future products.

If one is to speak of machine building, a mistake made in the stage of design, formation and establishment of the technical assignment for the new product is sometimes not discovered until years later, after the expenditure of immense efforts and funds on assimilation. And the main thing is that it is practically impossible to correct it then. I know well one solid firm which was the leader in its area for several decades, but then, in spite of the fact that it had an immense research and design base and experimental engineering personnel, it chose the wrong direction for its activity and now, having invested millions in renovation of production, has dropped to the ranks of the backward enterprises and, having swallowed its pride, must work from blueprints of its more far-sighted competitors.

This is why the director must participate actively in the work of the developers during the stage of the formation and establishment of the technical assignment and take on all responsibility for decisions made in this stage. And subsequent control over the development of technical and working plans, the assimilation and finishing of basic models and the preparation for series production can be completely delegated to the head engineer or his services.

Here is a fairly typical case from the area of machine building which is close to me. The boring machine, as we know, was a "spin off" from its predecessor, the lathe, during times when the typical part that had to be bored was the cylinder: the cylinder of the steam engine, the steam hammer, the piston compressor, the pump and so forth. In other words it was then necessary to bore a cylinder with a great length and a relatively small diameter. This was done with a long boring bar, one end of which was fastened to the working spindle and the other in a steady of the rear support. The processed part was strengthened on a table that was long but not very wide.

Decades passed, and technology progressed and changed--steam engines, piston pumps and compressors disappeared into the past and they were replaced by long cylinders. Now the typical operation for a boring machine was a reducer body--a part with many openings of a small depth. The boring machine operators were first to realize that it would be more convenient and quicker to process these items with a short mandrel fastened only in the spindle, with a turning radius of the machine tool table of 180 degrees. The engineer-technologists struggled with this "brain child," but the designers continued to design machine tools of the former composition which were intended for using boring bars. But life won out: the unnecessary boring bars and the rear supports deteriorated and rusted and during the next drive for gathering scrap metal they were sent for resmelting.

German machine tool builders were the first to draw the correct conclusions: they sharply reduced the length and increased the width of the table, at the same time increased the amount of weight it could hold and increased the precision of the turning, and they discarded the rear support. A principally new arrangement was originated. The machine tool was shorter, but wider, more convenient and lighter, and it began to correspond more to the real demands of modern machine building.

Having visited the FRG in the middle of the 60's and taken note of this change in design thought, when I returned to Leningrad I spent a long time convincing our venerable specialists, who in their time had burst forth to the leading positions in their areas of technology, that we should follow the Germans. They were only half convinced. They discarded the rear support and reduced the length of the machine tool, but unfortunately they did not increase the width. It took another four years under pressure from the consumers for them to increase the width a little bit--it was impossible to increase it any more without discarding the new design that had just been assimilated in series production. Then, finally, several years later, wishing to expand the sales market for our machine tools, we were forced to make a radical revision of the design another time. And yet all this could have been done immediately, almost ten years ago, and then we would not have had the losses related to a third assimilation.

I discussed this instance in order to show the frequent conservatism of our good, but narrow specialists, especially if they have had great successes in the past and belong to a particular school.

This is why the manager of the enterprise cannot be a side observer when determining the nature of the future products of his enterprise or, to put it more broadly, he is obligated to actively influence the development of the technical policy of the enterprise of which he is in charge. Naturally, to do this he must have a necessary minimum of the corresponding knowledge.

But the future of the enterprise is not just the level of the products that are produced. It depends to no small degree on maintaining existing equipment, buildings and structures in order and at the modern level, and on correct direction for renovating enterprises. And here the task of the director, in my opinion, consists of two sub-tasks: first, he must make sure of sufficient and prompt updating of existing equipment and, second, he must participate personally in considering and approving plans for renovation. It is important here not to fall into utopia and megalomania, but to take into account the actual possibilities of financing and the capacities of construction organizations, and also to determine correctly the distribution of production and the sequence of the renovation work, avoiding as much as possible radical changes and movement of existing collectives.

The current review of the implementation of plans for renovation that have been earmarked, naturally, should be done by the deputy director for capital construction. This, of course, does not preclude the possibility of direct intervention on the part of the director when the work falters or enters a blind alley.

In a word, the better the technical policy is thought out, the more and the more profoundly the director thinks about tomorrow, the easier it will be for him to work today. This is a rule without exceptions.

Democrat or Autocrat?

In current daily affairs the Soviet director should never forget that the final goal of his activity is the good of the Soviet people. And he approaches this goal by two different paths simultaneously. In the first place, as the organizer of the output of the products necessary to the society which have been entrusted to him by the enterprise. In the second place, as a person responsible for improving the material well-being and the satisfaction with life and work of those people who work under his leadership. Let us add to this that to increase production efficiency, that is, to carry out the main task for which he is responsible to society, it is impossible for him without conscientious efforts on the part of the entire collective under his jurisdiction, and the intensiveness of their efforts, in turn, depends largely on how it senses the concern on the part of the manager. Therefore a most important task of the director is the social development of the collective. And we are speaking not only about increasing incentive funds, obtaining housing and distributing it fairly, or constructing planned recreation bases, pioneer camps, stadiums and swimming pools.

It is no less important for the director to participate actively in the development of effective systems of material and moral incentives, in the development of competition and in the search for new forms of labor organization that are directed toward increasing production efficiency and the quality of life of the entire collective. All this most important activity is unthinkable without close, daily contact with managers of elected social agencies--party, trade-union and Komsomol. And it is not only that the authorities have given the party committee control over the activity of the administration, but that the rights of trade unions have expanded considerably in recent years. The party committee, the plant committee and the Komsomol committee, being elected agencies, have more effective "feedback" from the collective. As a rule they know better than the directors the collective's moods, needs and "sore spots." If the director controls mainly through the hierarchical chain of command and receives the workers only once a week at certain hours, the doors of the party committee and the trade union committee are always open to everyone.

It has frequently been difficult for me to understand those colleagues of mine who have complained about the limitation of their rights as directors: they say that they themselves cannot give anyone an apartment or sign for a bonus without the agreement of the trade union. It seems to me that is a poor director who tries to distribute housing, passes or bonuses without consulting the trade union committee. Every director can and must have his own policy regarding these issues, but he must carry it out through persuasion, observing all the established procedures, and not through impinging on the rights of the elected agencies of the workers. It is necessary to honor their rights as sacred and share power and responsibility with them in those areas where it has been granted to them.

Here, for example, is how we in our association resolved one of the most crucial problems--the distribution of new dwelling space. First of all we drew up a single list of those who needed it and included everyone who wished to improve their living conditions. For every applicant we gathered data for 28 indicators--the proportional space per family member, the overall length of service, the length of service in the association, the time of residence in Leningrad, participation in the war and the blockade, the children in the family, their age, condition of their health and so forth. Every indicator was given the corresponding point and an electronic computer was used to draw up a single list. This book was given the name "Elektronnoy" and was invaluable as a support for objective selection of candidates. It facilitated discussions with applicants for dwelling space when they were seen by the director or in the party or plant committee. When the next residential building went into operation, the candidates were selected primarily from the Elektronnoy book. But life is more complicated than any mathematics and therefore each of the members of the "triangle" had his own "protegee" who sometimes was not on the list of the Elektronnoy book.

Sometimes we argued ourselves hoarse in the "triangle" and far from always reached general agreement. After this we sent announcements of the selected candidates for the consideration of the "triangles" of the shops. If there was no unity in the "triangles" of the association, we determined the amount

of area assigned to the shop and several candidates for it. It turned out that there was also divergence of opinions in the "triangles" of the shop--then the question was brought up at a general meeting of shop workers and decided by an open vote. The lists that were drawn up this way were posted in a prominent place in the corridors and if no objections came in it was finally approved two weeks later at a plenary session of the trade union committee.

One must say that during 10 years of this practice (and each year we have distributed 5,000-6,000 square meters of dwelling space) I do not recall a single serious conflict or complaint to the rayispolkom concerning an unjust approach to solving these vitally important problems. Thus the democratic procedure and broad publicity contributed to no small degree to the creation in the collective of that which is generally called a healthy moral climate.

In the "triangle" we have successfully solved many of the problems directly involving the interests of collectives by bringing them up, if necessary, at meetings of the party committee and the trade union committee. For example, the announcement of the results of the competition of plants and shops for the quarter and the proposal for the distribution of "class positions" were made at an expanded meeting of the trade union committee by the general director, but the final decision, which does not always coincide with the opinion of the directors, was made by members of the committee with an open vote.

I recall that once the "triangle" could not come to a unanimous opinion about the distribution of the fund for social, housing and cultural construction. The fact is that the fund was not large and one of us insisted on allocating these funds for additional construction of housing, another--for the acquisition of passes and shared participation in the construction of a sanatorium, and still others--for free food for the smelting workers. We could not satisfy all of the wishes and it was necessary to decide according to the principle: either--or. Not having reached an agreement, we brought this question up at a conference for collective agreement and there, after stormy debates, it was decided by a majority of votes of the delegates. And in order not to pressure the delegates with the authority of individuals and organizations, having given the three alternative suggestions, we did not say who of the "corners of the triangle" was in favor of each of the suggestions.

From my point of view such utilization of already existing democratic institutions and procedures not only does not diminish the authority of the director, but, on the contrary, relieves him of the burden of personal responsibility and develops in people the valuable feeling of being the master, the feeling of participating in the decisions that are made.

I shall allow myself to give another piece of advice regarding the issue of the "housing policy," since this issue still occupies an important position in the social development of the collective. As we know, in large industrial centers and newly constructed areas a considerable part of the working contingent is formed from people from other cities and incoming youth who are housed in dormitories. At many Leningrad enterprises even today thousands

of workers are housed in dormitories and, as a rule, they are those in the specialties of which there is the greatest shortage--machine tool workers, smelters and forging workers. In their fervor to fill all the working positions the ministers willingly allot funds for the construction of dormitories, and certain directors are even proud of the increased number of modern, well-arranged dormitories.

I think that such a housing policy is short-sighted and inadmissible. I understood this with the first steps of my career as a director when I attended a meeting of residents of one of the dormitories. I received a flood of questions whose essence amounted to the fact that they had been living there for 3-5 years and did not know when they would receive permanent dwelling space, and after all they were living people and it was time to get married Not being able to promise anything specific, I joked:

"You fellows are young and handsome--get married to Leningrad girls who have dwelling space" "What kind of a fool would marry us?" The hall became noisy, and then a venomous question followed:

"Comrade Director, do you have a daughter?"

"Well, let us say that I do"

"How old is she?"

"What difference does it make?"

"Let me marry her," suggested the person with whom I was talking in the midst of the general laughter of the rest.

A young working man or woman can live in the dorm for 3-5 years at most. Keeping them there longer leads either to the unauthorized appearance of "family" corners and rooms, or to the person's departure from the enterprise in search of a better life. I am not even speaking of the other negative consequences of prolonged living in a dormitory.

Therefore in our association we have entered on a firm course toward the construction of only apartment buildings for workers with families and a gradual reduction of the number of dormitories. Additionally, we have moved older personnel from communal apartments located in the center of the city to individual apartments in new construction projects, and their places have been taken by young people who have been living in the dormitory for several years. This practice has eliminated the dormitories that are located in office buildings, in former military billets and in dilapidated wooden buildings, and has reduced several fold the overall number of people living in dormitories. But the main thing is that the young workers now have the firm conviction that life in a common room is a temporary thing. The personnel have also been satisfied for the rates of movement to individual, well-arranged apartments has increased appreciably.

The director must in all ways assist in drawing workers into the administration of the enterprise and contribute to the development of democracy without considering that this diminishes his authority and impedes the freedom of his decisions. One should not be too lazy to account to the workers, and not only in the annual aktiv meetings and conferences. It is not at all bad if the director, his deputies and other "number ones"--the secretary of the party committee, the chairman of the plant committee--give reports at workers' meetings in large shops and discuss the results of the work of the enterprise as a whole, the strong and weak points of this work and the prospects. I am profoundly convinced that in work with the collective we do not adequately utilize such a form as the workers' meeting, and I still recall times when it was utilized better. While giving permanent production conferences, people's control and "Komsomol search lights" their due, one cannot forget about the fact that individual elected officials and the aktiv work in these public organizations, but the workers' meeting embraces all workers. The better the director's intentions and plans are understood by each worker the easier it is for him to work himself.

The appearance of the director as an accountable individual is the best means of strengthening the sense of being a master in each member of the collective. Great possibilities lie in developing brigade forms of organization and stimulation of labor. Practice fully confirms the point that was included in the materials of the 27th trade union congress: "A brigade that is operating intelligently is an authentic school for the development of administrative skills in workers Such a brigade actually forges the feeling of being the master of one's plant, of one's country."

But one must not forget that autonomously financed brigades can reveal their own potential only if they become the basic unit of the production mechanism, if the entire system of plant operational-production and economic planning is oriented toward the brigade.

The widely known success in organizing brigade labor at the VAZ and the Kaluga turbine plant is explained precisely by the fact that at these enterprises the brigade is given a concrete plan not only in norm-hours or norm-rubles, but also in the products list, the numbers of items and the specific brigade-sets, and the collective earnings of the brigade depend directly on the fulfillment of this plan.

The author is a fervent champion of brigade forms of labor since he himself was the initiator of their development in Leningrad machine tool building, and later, participated in changing tractor production of the Kirov plant over the brigade labor. More than 10 years ago life itself forced us to turn to this form of labor organization. Up to that time in the shop of the head plant of the Leningrad machine tool association, which assembles machine tools for export, there was a prevalence of individual piece-rate work with division of labor strictly by operation. One worker "turned out" a mounting, another, a scraper, a third "set" the lower runners, a fourth, the upper ones, and so right down to submitting the machine tool to the foreign trade inspector. Each operation was received by a controller of the division of technical control, the order was immediately closed and submitted to the book-keeping office for payment But here is the problem: when the matter

came to an end, the foreign trade inspector discovered defects, the machine tool was dismantled again, and the high labor productivity achieved by the workers was "eaten up" when carrying out these reassemblies. Twice a year the shop chief went down on his knees before the labor division and asked them to write off the overexpenditures of the wage fund. Having consulted with leading workers, we jointly came to the conclusion that it was necessary to change over to brigade labor. There were many doubts. The masters objected: "but how will I be able to maneuver the labor force?" The highly skilled "leading light-monopolists" were afraid of losing their earnings. But nonetheless we made this decision. At first, as an experiment we started two brigades, and soon changed everyone over to brigade labor.

Now the brigade had one evaluation for the machine tool that was finally released to the inspector and packed in the box. The brigade leader received a bonus only for complete fulfillment of the plan. And here is the result: during the first three years labor productivity increased by 33 percent, and wages--by 14 percent. This same dynamic continued steadily in subsequent years as well. The quality of the products improved. The dependency on "leading lights" became a part of the past and now the majority of members of the brigade perform all operations, even the most complex ones. The workers themselves distribute the wages, and they themselves determine who should go on what shift and when they should go on vacation. Their interest in their work has increased sharply, skills have improved and, one might say, the psychology has changed: today when speaking with any member of the brigade you cannot distinguish his concerns from the concerns of the shop chief. They have arranged useful informal communications with the mechanics who sometimes compensate for defects in plant planning. And, finally, the bottom line: discipline has become stronger and labor turnover has completely stopped. Today, when there is a critical shortage of workers in the city, one can be hired at this shop only through a competition.

Of course in this case everything was relatively simple: a clear-cut final product which coincides with the final product of the plant, stable series production, and highly skilled workers. There is no doubt that it is more difficult to involve in brigade labor machine tool workers who for decades have been used to individual piece-rate work, and it is more difficult under the conditions of small series production to determine and plan the final product for them.

The brigade, especially at first, is a fine, even a fragile organism. The changeover to collective forms of payments involves the vital interests of the workers--it is a kind of "collectivization in industry," with all of its potential advantages and dangers when the approach is not skillful.

We are still far from solving problems of combining the brigade contract with the Shchekino method. But nonetheless, in my opinion, these forms of labor organization are almost the main organizational reserve for each director.

In conclusion let us repeat: under the current actual conditions even the most gifted director with the most solid character cannot rely only on his

mind, on his forces and on the autocratic methods of production administration. Only by relying on social organizations, primarily party and trade-union committees, and skillfully applying collective forms of labor organization, being concerned about the social development of the collective and using all measures to awaken and stimulate its creative activity can one be a good director.

What Kind of Director is a Good One?

The work of the manager of an industrial enterprise has never been simple. It is now becoming more and more complicated: frequently the production facilities themselves change, new means and implements of labor are constantly being introduced, flows of information are increasing rapidly, and the dynamism of events both within and outside the enterprise is increasing. These phenomena are related to the acceleration of scientific and technical progress and are global in nature, if one may put it that way. I have always been interested in the daily work of general directors of machine tool building associations when I have met with American, West German and Japanese colleagues: "what is the length of your own working day?" I always received similar answers: "11-14 hours a day."

Therefore the first requirements for an individual to be a director are good health, strong nerves and a cheerful character. But, in addition to the general requirements that arise from the development of the scientific and technical revolution, the management of a socialist enterprise has its own peculiarities. For the first time in history the Soviet director is in charge of truly free people: they are not threatened by unemployment or eviction from their apartment, they are confident in their future and in the future of their children. Our manager cannot influence his subordinates with fear or the threat of being fired--this eternal tool of compulsion in the world of exploitation. In order to achieve the goals that have been set he must be able to rely on the best qualities of human nature: the love of work, the desire to serve society and the noble spirit of competition. To do this he himself must understand people, their moods and wishes, and be able to organize work in such a way as to evoke and utilize the activity of each member of the collective of which he is in charge. It is not at all simple to carry out this task.

The complication of production, the interconnections and the interdependencies of people employed in it makes it absolutely necessary to increase discipline, the unity of will which controls the enterprise and, on the other hand, brings about increased skills of the workers and, consequently, a higher educational level and, as psychologists say, raises the level of their demands.

As a result, a contradiction that is typical of our dynamic times arises and becomes sharper, a contradiction between the need to observe one-man management, to subordinate man to the requirements of the plan, blueprints, technology and strict division of labor, on the one hand, and the natural desire of an intelligent, cultured (and, we might add satisfied and well-provided for) person for independent creativity, his lack of acceptance of rote

activity on another's order, on the other. On the one hand we have the rigid hierarchy and subordination, and on the other--the desire of each worker (sometimes not completely recognized) to play an active role himself, to resolve problems that arise himself.

This dialectic contradiction is not only inevitable, but also useful since it serves as a motive force for organization and automation of monotonous and heavy labor and the development of democratic principles in the administration of the enterprise. But it also extremely complicates the role of managers and places on them incomparably greater requirements than in past times. Therefore a person who does not understand the specific features of the age or does not feel able to cope with them, and nostalgically sighs: "Oh, if only we had a little unemployment,"--it would be better for this person not to take on the heavy burden of a modern Soviet director.

Pericles, ruling the ancient Athenians during the period of their greatest flourishing, said that the art of managing people is the most difficult and the highest of all arts. I think that today as well, two and a half thousand years later, these words retain their validity and, in spite of all the successes of the science of administration, administration itself remains primarily an art, and a very fine and complicated one. And like any art it requires of the manager primarily talent, the innate ability to lead people. I fully agree with those theoreticians who, when determining the requirements for the personality of the manager, put talent in first place, experience in second and knowledge in third place.

A talented manager is a rare phenomenon, in any case no more common than a talent composer or writer. Of course the manager must also learn the technique of administration just as the artist learns the technique of painting. But it is wrong to say that every person who has completed a special VUZ will become a manager in time. Talent is revealed only by life itself. It is not enough to take tests, courses and examinations here. The evaluation of the collective, public opinion, real success in real life, study and careful selection of candidates for promotion by party agencies--these methods will always be the main ones when assigning management personnel.

I do not have very much confidence in the possibility of automating this extremely refined process, even with the help of the most powerful computers or intelligent programs.

And so, above all--health and talent. As for experience, there is no need to go into the advantages of this. Therefore let us discuss the knowledge the manager of an enterprise must have. Of course he must master the fundamentals of the science of administration, be familiar with its various schools and doctrines, develop his own personal attitude toward them and be able to use devices which he himself selects in his own practice of administration. In foreign, especially American, literature one frequently encounters assertions that the manager has a special universal perfection and it is not at all necessary for him to master the specific knowledge of technology and technical equipment of the enterprise which he is managing. It is also

thought that transferring an extremely successful president of an automotive company, say, to a radio equipment firm is not only possible, but also useful, since it enriches the latter with fresh new ideas and will contribute to the transfer of advanced practice. I think that this is true only if the transfer takes place among purely related enterprises with production of nearly the same nature. For example, at one time I transferred from turbine construction where I had worked for 25 years into machine tool building--a branch with largely similar technology, equipment, and principles of organization of production. It was also easy for me to enter the new role because for many years I had been a shop mechanic, the head mechanic of a plant and I had dealt with the same machine tools as an operator. But I would not risk becoming the manager of a ship building plant, and certainly not of a textile combine.

The director should be sufficiently competent in all of the aspects of the activity of the enterprise which he manages. Of course he is not obligated to know the fine points of all the technological processes or be able to deal with the peculiarities of the machines that are produced than the head designer, but he is obligated to have sufficient knowledge so as to make it impossible for any one of his subordinates to deceive him or lead him down the wrong path with its fraught with negative consequences for the enterprise. There is a good French saying which, in my opinion, gives an exhaustive answer to the question of the depth of special knowledge necessary for the manager of the enterprise: "In order to know about the taste of fried eggs it is not necessary to be able to lay an egg yourself." So the director, of course, cannot and should not have a better grasp than the head engineer or the head technologists of the issues that are within their competence, but he must be able to understand about the "fried eggs" that are prepared by them.

What other personal qualities, character traits and temperament must the manager of a Soviet enterprise have under modern conditions?

In numerous textbooks and instructions preference is given to an individual who is restrained, calm and thoughtful. He must not raise his voice and he certainly must not argue, he must be able to listen to his subordinates patiently, to act not so much on orders as on conviction, consult with the collective as frequently as possible, be concerned about its needs, be cautious and attentive, and be available and democratic. He must be able to inspire respect.

All this, of course, is true. But let us say frankly that people who have all these qualities are not encountered in life much more frequently than angels are. If a person with average talent is guided by such recommendations, he risks ending up in the role of the head negotiator, he risks weakening discipline and in the end he risks impeding the cause and leading the collective into a blind alley.

One now generally condemns a manager who is self-confident, independent and powerful. And this is also correct, especially if these qualities are combined with inadequate intelligence and poor knowledge of the business at hand. In our day people are not motivated by shouts about shock labor. But I

cannot unequivocally condemn the so-called firm style of a manager. Among the directors who are my good acquaintances I know a person who is strict, self-powerful and also rude. He uses the familiar form of address to his subordinates, in a large enterprise one cannot even move a garbage can to another place without his knowledge, and nonetheless the association he heads operates excellently and he himself has earned high awards and enjoys unquestionable respect in his collective A paradox? Certainly not. The fact is that his sharpness is compensated for successfully by such qualities as adherence to principles, fairness in his relations with people, constant and courageous concern for the needs of workers and a profound knowledge of his business. He has a solid reputation as a "good master," which people value extremely highly.

It seems that the style of management depends largely on one's inherent temperament, the qualities of character and the individual peculiarities of the personality. This style must primarily be natural and restrained. Subordinates are very quick to catch and disapprove of the slightest falseness, affectation or pose in the style of their leader. He must always remain himself. This is why it seems to me fruitless to try to give any universal formulas regarding this delicate question.

Managers can and should be very reasonable, but still each of them must be honorable and orderly and have their own style which is theirs alone.

My experience in life enables me to name only the minimum number of qualities which the manager of any production collective should have. Of course this list is far from exhaustive, but I insist on its correctness.

A manager must first of all be decisive, for his main product is prompt decision-making. This does not mean, of course, that he can make decisions hastily without thinking. Moreover, the more frequently he consults with people before making a decision, the surer he is of avoiding mistakes. But it is quite inadmissible to back away from making a decision when the issue has come to a head and the business demands this.

One can never renounce words that were once spoken or orders that were once given, or place one's subordinates under attack regardless of the unpleasant consequences that may arise for oneself.

The manager must always keep in mind the interests of the state and avoid any actions that cause harm to society. He must remember that writing items off and whitewashing situations not only cause harm, but also serve as a most reliable means of disintegrating discipline at the enterprise and losing the personal authority of the manager in the eyes of the collective.

Additionally, a most important task of the manager consists in defending the legitimate interests of his collective and being concerned about its well-being. He must constantly make sure, expressing himself in scientific language, that balance is maintained between the contribution of each member of the collective and the satisfaction of his needs. Here we are speaking not only and not even so much about material satisfaction. Of no less importance

for the individual are a fair evaluation of their labor in the collective, interesting work, a general atmosphere in the shop or in the plant, moral encouragement of merits and, finally, the public reputation of the home enterprise.

An important piece of trivia: the director of even a very large plant must not forget to greet the workers when he passes and shake the hands of old acquaintances. If a misfortune has occurred in someone's home, he should be confident that he can turn to the director without embarrassment and ask him for help, for instance, to provide a car quickly, and the director will give it to him.

There is one more important and difficult responsibility of the Soviet director--not to give his subordinates deliberately unrealistic or impossible assignments. It must be admitted that with so many higher levels that are independent of one another the director sometimes simultaneously receives several mutually exclusive assignments, and all of them are urgent and all very necessary.

Of course, being disciplined, he can "drop" all these assignments on the shop, and to the question of the shop chief as to what should be done first he can answer: "everything needs to be done." In principle the shop chief can say the same thing to the master. But if the master gives the lathe operator five assignments at the same time and does not say which one is to be done first and which one is to be done next, the lathe operator will shrug his shoulders and select the one he likes the best. His neighbor will act the same way, and the neighbor might prefer a part from an altogether different assignment. As a result one ends up trying to assemble ten prepared parts from ten different assignments, but there is not a single set, and none of the ten assignments will be carried out. This is why the director must absorb pressure that comes from above in opposing directions and take on his own shoulders the responsibility for the failure to fulfill certain assignments on time. Yes, the director must be a brave man!

When evaluating people and events the director must not be guided by personal sympathies and antipathies, even though, naturally, he has them like every other person. He must be able to suppress them and try to be dispassionate in any situation of conflict. It is necessary to develop in oneself the difficult habit of accepting criticism calmly and in a businesslike way, and in no case should he persecute his subordinates for this, even if it is unjustified.

As for the tone of business conversations, I do not see any great harm if the director (not frequently!) raises his voice. But he should always remember that he can argue only with his direct subordinates and it is best if it is in private, without witnesses. In no case should he publicly attack rank-and-file workers, whom he encounters only rarely. If a good director blows up once in a while he will be forgiven. People are willing to put up with the small human weaknesses of the manager if they feel they are guided by an intelligent mind, a firm hand, and if business is proceeding successfully at the enterprise.

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MANAGEMENT ENGINEERING PRINCIPLES DISCUSSED

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[Article by V. Sh. Rapoport, chief of the division of administrative procedures of KamAZ (city of Brezhnev): "Administration Technology--A New Engineering Discipline"]

[Text] Three Examples

Babel. The biblical parabel about the ancient Babylonians who decided to ascend to heaven is widely known. They began to construct a gigantic tower and things went so well that God was faced with a problem--to let these uninvited guests in or not.

After some wavering he still decided that it is better to enjoy such energetic builders from a distance. And he began to think how to disrupt the construction of the tower. The method by which God achieved his goal causes one to think--the builders who up to this time had spoken in one language suddenly stopped understanding one another. The lack of coordination of plans that is usual in cases like this led to a situation where the tower collapsed.

People who have had occasion to participate in the rapid establishment of gigantic new enterprises have repeatedly fallen into a situation which is reminiscent of Babel.

For example, some of the workers of KamAZ and the institutes that developed the KamAZ automated control system were armed with technology from the IBM firm (United States) which was almost not translated into the Russian language. As a result, when they discussed with their colleagues problems and methods that were simple and well known in the USSR, the impression was created that they were speaking about something unusually complicated and new. A careful deciphering of the confused terminology showed that much of this arose from a lack of coordination of plans.

This is an extreme situation. Much more frequently one encounters in practice more noticeable, and also more dangerous language barriers.

New collectives are formed from workers not only of new plants, but also of various branches, sometimes fairly distant from one another. And each plant and especially each branch has developed its own business jargon which is sometimes quite specific. The number of the blueprint of a part in some plants in common parlance is called a "number," in others--an "index," in still others--a "make," and so forth.

There is an even greater difference in the stereotypes of the performance of one administrative job or another. One head bookkeeper of the KamAZ engine plant demanded that every bill of lading have his signature--this person came from a small plant, whose small number of products were controlled individually by the head bookkeeper. In the end he was unable to work in a plant with mass production.

If modern "towers of Babel" have not fallen it is only because the collective sooner or later develops a common business language, but still the losses involved in overcoming language barriers are extremely appreciable and they are the more so the larger and more rapidly a new collective is created.

The corrupt telephone. The atmosphere was white hot at a conference of the management of the association. The conveyor was threatened with halting because of the failure to deliver parts. The deputy director of the supplier plant turned pale and then red, heard thunder and lightening addressed to him, proved that he had not been given the necessary instructions, that he constantly checks on this part, and so forth.

When the administrative organizers were instructed to study the situation it turned out that in spite of all the orders the party who was truly guilty of the disruption (and he turned out to be the master of the shop for manufacturing stamps) did not even have any suspicion of the trouble surrounding the ill-fated part! As it turned out, the multilevel hierarchy of the administrative structure of the large plant contributed to this, and this means the long chain for transmission of information, and also the distortion of information when it is being transferred as a result of differences in stereotypes and jargons among the participants in the process.

The effect of the "corrupt telephone" is manifested especially strongly in new collectives, but also in existing collectives, as their administrative systems become larger and more complicated it is just beginning to come into effect.

The bureau chief Sidorov could not tolerate the slightest pressure from the chief of the supply division. He worked at his own moderate tempo without recognizing emergencies, and he refused complicated business trips. In response to any attempt to intensify his labor, Sidorov submitted an application to be released at his own request. And the chief backed off. The fact is that among the young workers of the division [including the chief] who did not have much experience in supply yet, only Sidorov knew how to fill out the forms for various cases of supply practice, especially applications for repair and operational needs. Whose visa is needed, who should sign after whom, what to send where--all these fine points of the business remained in

his memory and if he left he would leave the division without a living reference book on the supply business. Yet his clear indifference to the interests of the matter had a negative effect on the psychological climate in the collective.

But in keeping with the schedule for the development of an automated control system, developers of administrative procedures began to work with the division. They gathered all the documents, standardized them, described the work with each of them, taking into account the utilization of electronic computers, and placed on the desk of the division chief the administrative procedure, "drawing up, protecting and carrying out applications," in the form of a neat printed brochure.

Within a month it suddenly became clear of its own accord that the bureau chief Sidorov had almost no importance for the operation of the division. The young workers quickly learned the procedure and stopped turning to him for advice, and he had long ago abandoned specific matters. In order to maintain his prestige, he had to begin to work on a level with all the rest or . . . leave.

Documentary Technology of Administration

Machine builder technologists several decades ago encountered the need to write down technological processing processes in detail. Two factors brought them to this--the specialization of equipment and the profound division of labor among the workers.

As we know, the introduction of the YeSTD [unified system of technological documentation] which has taken almost a decade is now being completed. It is a detailed description of the technology of processing. It is quite obvious that in control systems we are faced with the same need today and for similar reasons. Deep specialization of administrative labor at large modern enterprises and the application of complex and ultracomplex technical equipment for processing information makes it impossible to establish uniformity in administrative work by the old methods: instructive conferences, the issuance of individual orders and instructions, personal training of subordinates and so forth.

The connectedness of control systems has increased sharply, and each organizational decision must be checked for feasibility and lack of contradiction, using a large volume of specific knowledge. This frequently makes it inefficient for local managers to make the customary organizational decisions since they usually do not have the time and frequently they do not have the special knowledge for this kind of development. Therefore a need arises for professional administrative technologists who have the time and knowledge for this.

But the results of the labor of new specialists, on the one hand, must be put into a form that is comprehensible to the managers who are being supervised and, on the other, they must be given to the workers under conditions

when the technologist himself does not participate directly in administration. Therefore the establishment of an administrative technology that is formulated in documents as a new engineering discipline has become a primary task for administrative organizers.

As early as 1911 G. Emerson, the author of the book "Twenty Principles of Productivity," in a special chapter insisted on the need for standard written instructions for all kinds of activity, including administration. "An enterprise that does not have standard written instructions," he wrote, "is incapable of steadily advancing Five years of planned and registered movement forward produces more than 20 years of random attempts whose results remain only in the memory of the employees who are being replaced."*

The irreplaceability of workers of Sidorov's type rests not on personal talents and not on a great ability to work or devotion to duty, but only on a knowledge of work traditions. These traditions are not so complicated that they cannot be mastered by a VUZ graduate if only they are intelligently described. Therefore documented administrative technology makes the organization less sensitive to the turnover of specialists of technically uncomplicated specialties and to their personal qualities.

Emerson writes about registered movement forward. Indeed, people are constantly striving to improve their work, but it is precisely because of everyone's desire to work in his own way that good discoveries soon end up buried under later and less successful innovations. If one were to introduce and maintain technological discipline on the basis of documented technology, it would be possible to introduce it systematically, to reinforce successful discoveries and to prohibit and discard unsuccessful ones. Emerson writes about this as well.

Certain Rules of Administrative Technology

The development of administrative technology requires a systematic, comprehensive approach to the planning process, which presupposes the utilization of knowledge from a fairly broad sphere.

When arranging any administrative procedure that appears elementary at first glance, say accounting and control of interplant (intershop) transfer of parts and components, one can approach it from the standpoint of electronic processing of data and from the standpoint of the requirements of bookkeeping and operational accounting, and construct an irreproachable procedure from both points of view. As a result we obtain input and output data that are correct in form, documents that are correct in form, and so forth. But if we also take into account the conditions for the organization of production (the availability of packaging, scales, counting equipment and so forth), we will have no confidence that the figures contained in these documents reflect reality.

*Emerson, G., "Dvenadtsat' printisipov proizvoditel'nosti" [Twelve Principles of Productivity], Moscow, 1971.

Even if we account for production conditions and all technical possibilities but we do not create motivation on the part of the workers to make the accounts reliable, will people utilize the existing possibilities, and the figures in these documents that are correct in form--will they be correct in essence?

And if we introduce some incentive for the workers to ensure reliability, we will have to entrust to someone the control over the indicator of the work for reliability. But then the question arises: what will motivate these controllers to really control the workers?

Such a series of questions which arise with a systematic approach to the development of administrative procedures, it seems, makes this work not quite definite. But as experience is accumulated it becomes possible to reveal and formulate rules that correspond to the objective patterns of good administration, that is, that correspond to scientific administration. These rules can no longer be conscientiously applied by any developer, regardless of his personal experience and capabilities. Thus there will gradually be a transformation of administrative technology from the art of a few into an engineering discipline which many can learn.

Our experience in developing administrative technology has made it possible to formulate the rules presented below. Some of them are obvious and require no explanation. But other rules not only require explanation, but also require a description of the practical devices that accompany them. Nonetheless we shall comment on certain rules. A brief formulation of the rules themselves is presented at the end of this article.

Motivation of the workers is one of the most important rules of administrative technology. Only in rare cases is the worker directly motivated in the results of his action. And in the majority of cases it is necessary to construct a special link between the results of a given action and the personal interests of the worker. Planning these links is frequently the most complicated part of the work for planning administrative technology since it is necessary to construct complicated system of autonomous financing, labor indicators, accounting for the socio-psychological aspects of administration, knowledge of the labor code and labor law, advanced practice in labor organization and socialist competition, and so forth.

The introduction of any indicators that provide a link between the results of the actions of the worker and the amount of his motivation leads to planning accounting and control in terms of these indicators, that is, an additional auxiliary action of administration arises with additional co-workers. But the rule of motivation is again applicable to this action

Hence we come to the rule of dual control. In principle the system of control of implementation should penetrate the entire hierarchy of the organization from bottom to top, but this leads to increased expenditures. Therefore it is necessary, where possible, to turn to control on the part of the consumer of a given action, to selective methods of control, to automated methods and to other means of reducing labor-intensiveness.

The application of the rules of motivation and dual control can be illustrated by the following example.

Having achieved an improvement in the quality of repair of equipment, we introduced bonuses for the repair brigade related to the indicator of the observance of the normative for idle time of equipment during repair (in keeping with the rule of motivation) and planned a procedure for accounting for emergency work whereby on the bill of lading the production master noted the actual number of hours of idle time during repair.

And the introduction of this procedure showed that even though the bonuses began to be paid regularly, the actual return from the equipment did not increase because, with a reduction of the amount of idle time during repair that was accounted for on the bills of lading, the overall amount of idle time of the equipment did not decrease. It turned out that the number of hours of idle time on the bills of lading were usually entered by repair workers, and the production masters signed the bills without looking at them since this did not involve their interests, and it is usually undesirable for masters to damage their relations with repair workers.

Then, using the rule of dual control, we developed for the line personnel of shops the indicator of the assimilation of the planned hourly productivity of equipment. This indicator took into account only the time actually at the disposal of the line operators, that is, the amount of time minus all idle time that was not the fault of production personnel, and therefore any coverage of someone else's idle time automatically involved a reduction of the bonus for the line personnel. Thus, in the first place, the control became dual, and in the second place, it was less labor-intensive since no special controllers of line personnel were needed here.

The coefficient of the assimilation of the planned hourly productivity is obtained by calculations from data concerning the actual products produced, and with this system, the correctness of accounting for idle time is controlled mutually by the interested parties (the opposition of the interests of production and repair personnel is utilized).

In order to illustrate the rules of control after the fact, let us consider the following example. According to the existing policy in the association, in order to obtain spare parts for equipment from the warehouses it was necessary to gather signatures from the master repairman, the chief of the spare parts bureau of the division for analysis and planning of plant repairs, the chief of this division, the head engineer or director of the plant, the head bookkeeper of the plant (stamped with an ellipsis stamp), the chief of the bureau for spare parts of the equipment administration, the division chief of this administration, the chief of the administration himself or his deputy, the head bookkeeper of the administration, the head of the warehouse and, finally, the recipient--a total of 11 signatures!

The majority of the signatures are necessary for control over the justification for issuing the parts. An analysis showed that the controlling parties are essentially controlling nothing since frequently they do not have time

even to glance over the documents, and they are oriented by the appearance of the official stamp of the person to whom the part is entrusted (violation of the rule of necessary productivity). Some of these parties, moreover, do not have immediate access to information necessary for making a decision (violation of the rule of information). As a result, only a couple of the signatures had actual validity, but it was not formally entrusted to them.

When developing a procedure in this case we made the following decisions:

to divide the list of spare parts up in terms of the indicator of usability in one or several shops and to determine for each group the distribution center that bears full responsibility for distributing them. Based on this rule of information these centers could be only the spare parts bureaus of the plants, the division of spare parts of the administration of repair and service of equipment, and the REN (repair and operational needs) division of the administration of equipment--each for its own products list;

to instruct certain permanent workers at each plant to issue and receive spare parts, giving them permanent certificates from the administration of equipment (this removes the need for an ellipsis stamp for each request);

to eliminate all control signatures of managers, but to organize the movement of documents in such a way that after they have been filled they go to the bookkeeping office where they can be checked, both individually and statistically, and if violations are discovered measures can be taken against the violator.

As a result, everything has been reduced to four signatures: of the repair master, the chief of the plant spare parts bureau, the chief of the spare parts bureau of the equipment administration, and the head of the warehouse. The responsibility of the workers for the distribution of the spare parts has increased and control on the part of the bookkeeping office has improved.

The rule of necessary productivity is also obvious, but its application is frequently difficult. Thus when planning a system of control over the course of assembly production using dispatcher communications and manual accounting for the balance of movement of motor vehicles in the assembly shops, it turned out that for one telephone request the RI (information registration) operators take an inadmissibly large amount of time (the data were obtained by acting out the situation during the course of planning). It is possible to reduce this time in two ways: to reduce the information or to double the number of workers.

A comprehensive analysis of the information that was given was necessary in order to find ways of reducing it (the analysis was conducted according to the criterion of the need for the given information for administration in the hourly rhythm). At the same time we found a way of partially doubling the workers without increasing their number.

The example with registering spare parts presented above can also serve as an illustration for the rule of work along the horizontal and the rule of administration in terms of deviations.

The improvement amounted to establishing the work along the horizontal at the level of the chiefs of the spare parts bureaus of the subdivisions.

Another example is the work of the engineering planners of the PDB (production-dispatcher bureau) of the industries. Each planner must maintain communications with planners of the PDB's of related enterprises and independently resolve all problems of planning deliveries and eliminating deviations during their course, as well as mutually verifying information, even if it concerns the PDB within another plant (that is included in the association). And only if it is impossible to solve the problems independently do the planners have the right to transfer the decision to the higher chiefs of the PDB and the PDO (production-dispatcher division), and so forth.

The rule of administration from statistics. In the control of an organization (that is, the control of human collectives) most of the deviations appear because of the mistakes of past periods (days, ten-day periods, months). As a rule, immediate measures to eliminate deviations that appear do not eliminate the causes of them. Most frequently the so-called forrester law is justified here. It says approximately the following: "With an inadequate understanding of the laws of complex self-organizing systems, the more energetically we solve short-term problems, the more we confuse the long-term ones."

Most frequently of all we observe "administration from a deficit in the real scope of time," when the entire administrative staff operates actually on commands from the welder-assembly worker. Elimination of the deficit in these cases is possible only through extreme measures which, as a rule, exacerbate the causes of the deficit even more. In the majority of cases this becomes inevitable. But if one regards these measures as only auxiliary, and devotes basic attention to establishing the real causes of the deficit and eliminating them, it will be necessary to accumulate and statistically process data of the kinds, causes and parties guilty of the deficit over fairly long periods of time.

Here one must most frequently understand statistical processing to meet the construction of curves of distribution of the kinds of shortages in time for various reasons and caused by various people. Such processing immediately singles out from the apparently immense number of causes of the deficit those several positions which account for the lion's share of the entire deficit.*

A typical picture of a violation of the rule of unity of the source of initial information is a case when, for example, the indicator of the quantity of the indicator of manufactured parts in the subsystem for the operations

*Concerning methods of statistical analysis of deviations from the normal course of production, see the article by I. L. Polishchuk, G. A. Gabbasova and V. D. Kantayev, "Disturbances of the Course of Production: A Statistical Approach," EKO, 1977, No 3, ed.

account is taken from the bill of lading and in the subsystem for wages--from the bill of lading or the shift assignment. As a result there are constant artificial increases in the bills of lading and a lack of correspondence between the work that is paid for and the products that are received. In order to eliminate these shortcomings, duplicate documents must be abolished. The establishment of rules for filling out duplicate documents finally helps very little since usually one does not achieve real control over their correspondence to one another.

The rule whereby the filling out of the initial document is combined with the manufacture of machine information bearers is necessary because with electronic processing of data there arises a new operation of transferring data to the machine bearer, which the worker tries to avoid, and the problem of mistakes in key punching arises.

In this case it is best to fill out the initial documentations at the information registration office with simultaneous punching of tapes (or other machine bearer) and documents that are singled out not at the information registration office, but by hand, are to be considered invalid.

The rule of documents that are passed on seems somewhat artificial. But violation of it leads to the most serious consequences. The practice of giving each worker his own copy of an initial document requires printing a large number of copies, reduces their legibility, increases the labor-intensiveness of reproduction, reduces the attention to the promptness of processing and accounting for them, and does not instill a desire to master work with machine printouts.

For example, when transferring parts the bill of lading is usually filled out in six copies: for the warehouse of the recipient, for the warehouse of the supplier, for the bookkeeping office of the supplier, for the bookkeeping office of the recipient, for the PDB of the recipient and for the PDB of the supplier. As a result the following circuit of operation is formed. The warehouse workers accumulate bills of lading (bare copies) and put off until a "convenient time" the transfer of these to punch tapes for registration, being responsible at the same to the bookkeepers and the PDB's for their copies, and the PDB does not control the accountability of the warehouses to the bookkeeping office since it uses its own copy of the bill of lading. There ends up to be three independent information flows with a divergence in time, and sometimes also in figures (because of the poor quality of the copies).

The correct work circuit should be the following: only two copies of the bill of lading are filled out. One follows the path: the registration of information is combined with the printout produced by the computer center on the basis of this information (with correction of mistakes)--the PDB--the bookkeeping office of the supplier. The second follows the path: warehouse of the consumer--PDB (joined with the printout here)--bookkeeping office of the consumer.

Such a circuit provides regular interaction among workers of the warehouse, PDB, bookkeeping office and computer center for verifying information, which opens up the path to providing all managers with a great diversity of accounting, analytical and report information in the form of computer printouts.

The rule of centralization of resources that are in short supply essentially answers one of the most important questions related to the organization of administration: when is it necessary to centralize? This rule can be most clearly illustrated by the procedure for the organization of repair jobs.

From the standpoint of almost all the preceding rules (with the exception of the rule of the least action) the most efficient organization of the repair service would be the creation of a special repair brigade in each section and on each automated line. Then it would be easy to provide incentives for their labor directly according to the results of the output of the basic product and the control of their work would be reduced to a minimum. But modern technical equipment is complicated and its repair requires profound specialized knowledge of mechanics, electronics, control and measurement instruments and automation equipment, hydraulics and pneumatics. There are practically no masters of all trades who have all of this knowledge. And of the available specialists, say, in electronics, there is always a minority with high qualifications and a majority with inadequate qualifications.

If they were to be divided up into brigades, in some brigades there would not be enough highly qualified workers and in others they would be unutilized, and as a result the level of repair service would drop. Therefore repair workers of specialties where there is a shortage should be centralized in special repair groups, brigades or laboratories. Then along with each repair worker with high qualifications there would be several repair workers with average or even low qualifications who do all the uncomplicated work. And if necessary a specialist with high qualifications can be sent to help any of them. This creates not only the best conditions for utilizing the existing qualifications, but also for increasing them. A beginning electronic repairman in a specialized brigade learns by gaining experience from his more skilled comrades while in a comprehensive brigade he is the only electronic technician and can learn only from his mistakes.

But the organization of specialized repair brigades requires a complicated system for controlling their work. Since the zones of service of these brigades are large, a multitude of problems arise: how to relate the results of the labor of repair workers with the overall results of production; how to distribute brigade resources correctly, depending on production needs; how to account for the work of the brigades, and so forth.

In order to solve these problems a procedure was developed, "dispatcher work for emergency repairs," which envisions a system of dispatcher communications, accounting and statistical processing of data concerning repairs and mutual control of production and repair brigades.

The best illustration of the rule of the utilization of autonomy is the brigade contract. While today's automated control system is capable of giving each worker his assignment each day, this still does not mean that this is what should be done. It is much more correct to organize the workers into brigades, and not formally, but in such a way that the brigade actually has certain possibilities of self-control (interreplaceability of workers, machine tools and instruments), to determine the actual limits of self-control

and to give the assignments precisely within these limits, leaving the rest to the discretion of the brigade.

And, finally, there is the important rule of system coordination of decisions. In administrative technology the relatedness (dependence) of decisions on policy is higher than the relatedness of decisions in production technology. Therefore without checking the best partial decision to make sure that it is coordinated and not contradictory, one cannot be confident that no harm will be caused to the entire system of administration.

We recognize that the rules we have drawn up far from exhaust the entire complexity of administrative technology, but we hope that subsequent accumulation and analysis of experience will make it possible to reveal and formulate many more useful rules for the development of administrative technology.

Rules for the Development of Administrative Technology

1. The rule of least action. Any action should be taken with the least possible expenditure of resources. When beginning to plan some action, try first of all to get by without it.
2. The rule of motivation of the worker. A condition for effective performance of the planned action is motivation of the worker to carry it out promptly and well.
3. The rule of dual control. For any action there must be control. Actions of controllers, in turn, must be motivated and controlled.
4. The rule of control after the fact. Control over the correctness of actions of the same kind that are constantly being repeated by permanent workers should be exercised not during the process of fulfillment, but in terms of the result, placing maximum responsibility on the worker.
5. The rule of necessary qualifications. The performance of actions should be entrusted to a worker who has the qualifications to carry them out.
6. The rule of information. The performance of an action should be entrusted to a worker who has sufficient information necessary for carrying it out. Or, conversely, the information necessary for carrying out an action should be given to the person who is instructed to perform it.
7. The rule of necessary productivity. The performance of an action should be entrusted to a worker who has a real capability of carrying it out in the required amount of time.
8. The rule of work along the horizontal. When performing routine work which is permanently part of the responsibilities of a given worker, he is obligated to interact with the workers of his level in related subdivisions, informing the manager only of the results.
9. The rule of control from deviations. Managers of higher (over the workers) levels intervene in the course of the work only when there are deviations which the workers have not eliminated themselves.

10. The rule of control from statistics. Information from production statistics over an extended period is more important for making administrative decisions than immediate information about the condition of production.

11. The rule of unity of the source of initial information. If in various subsystems or tasks of administration one uses one and the same initial indicator, there should be only one course of initial information with respect to this indicator (one document, one person, one position, one automated instrument and so forth).

12. The rule of combining machine and manual documents. If data are transferred from a manual document to a machine bearer it is necessary to try to obtain the given manual document as a machine record for registration.

13. The rule of documents that are passed on. Initial documents should be printed in a minimum quantity of copies. Services that use initial documents for notes in control information, journals, card catalogues and for checking printouts should subsequently transfer the initial documents along the line of accountability. Only the final control subdivisions (bookkeeping offices and sometimes other services) should store initial documents in their archives.

14. The rule of surveying of documents intended for managers. Analytical and report documents intended for managers should be arranged in such a way as to give the manager the opportunity, without reading it in detail, to immediately make value judgments of the types "good," "bad," "better," "worse" and so forth.

15. The rule of centralization of resources that are in short supply. Centralization of the control of any kind of resources should be in direct proportion to the shortage of them.

16. The rule of utilization of autonomy (self-control). People always strive to determine for themselves the order of their work. Therefore it is useful not to regulate their actions in detail, but to create conditions so that they themselves will find efficient ways of organizing their work.

17. The rule of standardization of decisions. As the number of documented technological administrative processes increases, it is necessary to give preference to standard decisions everywhere where this does not contradict the other rules.

18. The rule of systematic coordination of decisions. Every decision regarding administrative technology should be checked for coordination and lack of contradiction with previously taken decisions regarding other technological processes (procedures) of administration and also other subsystems.

19. The rule of reliability of workers, technical equipment and methods of storing information. Every planned action should be checked for reliability in terms of the worker, the technical equipment and the means of storing information.

Administrative Procedures at KamAZ

The administration of the main production with the help of documented technological processes (procedures) of administration (TPU) at KamAZ has become an established way of thinking and acting on the part of the majority of administrative workers.

As of September 1982 there were 66 TPU's and RTM's (technical guidance materials) in effect: for organization of administration--5 titles; for material and technical supply--6 titles; for administrative of main production--16 titles; for transportation--5 titles; for quality--6 titles; for automotive service--3 titles, and so forth.

All TPU's that have been submitted for production are taken into account and regularly updated in "News About Changes," and are periodically reissued (when there are large changes). Thus one TPU is already in its fifth edition, one TPU in its fourth edition, 8 TPU's in their third edition, and 14 TPU's in their second edition.

The most important TPU's are approved and introduced for experimental and then industrial operation by an order from the general director.

There are regular inspections of the implementation of TPU's, at which time the corresponding reference material and documents are filled out.

✓ The division of the UOP [administration of production organization] of KamAZ is now working not so much on planning new TPU's as on controlling, analyzing and improving existing ones.

On Thursday of each week there is a conference on introducing and maintaining TPU's with the production director of the association. The conference is led by the chief of the UOP and is attended by chiefs of the planning and dispatcher division, the divisions for automated control systems for plants, and representatives of all necessary KamAZ services and administrations on the agenda.

The tasks for automated production control systems, as a rule, are introduced through TPU's, which provide for organizational support for the KamAZ automated control system.

The development and introduction of procedures at KamAZ are arranged on a clear-cut methodological basis which is documented in the form:

RTM 37.104...--82 "Planning technological administrative processes";

TPU 10.01.2-82 "Coordination, approval and introduction of technological processes (procedures) of administration";

TPU 10103.2-82 "Reproduction, accounting and distribution to subdivisions of technological processes (procedures) of administration and the introduction of changes into them";

TPU 10.02.2-83 "Filling out orders, planning and manufacturing blank forms";

RTM 37.104.010-80 "Basic provisions for standardization of existing and newly developed forms of KamAZ documents."

In keeping with these documents a system has been arranged for registration, development, norm control, coordination, approval, publication, introduction, archive storage, introduction of changes and control over execution for all technological processes of administration.

We develop procedures in stages.

1. Investigation and refinement of the formulation of the problem.

This is a responsible stage and all our attempts to simplify it in order to accelerate development, as a rule, have led to prolonging the time periods for development. For especially complicated problems we have written coordination of the formulation of the problem with the higher management.

2. The development of "basic provisions of TPU's." In this stage we make the principle decisions. For example, when developing TPU 13.08.1-80, "Accounting and control of technological shipments," the following decisions were suggested:

- a) to pay the leaders for the final product;
- b) to introduce the brigade method for the organization of the labor of the leaders;
- c) as a source of accounting data to use data of the problem of the automated control system "control over the course of production."

The "basic provisions" are coordinated with the higher management.

3. The development of a rough copy of the TPU.

4. Coordination of the TPU. Here the rough draft is reproduced for all of the coordinating services and the coordination is organized by the parallel method. The service gives remarks only in written form. The remarks that are received are considered along with the services in private meetings or at general conferences, where decisions are made regarding their acceptance or rejection.

5. The development of final additions of the TPU.

6. Repeated coordination and certification.

7. Coordination with the higher management of the TPU which has already been certified by the managers of the middle level.

8. Approval of the TPU by an order for the association. With this same order the TPU is put into effect as an experiment.

The TPU is introduced in the following way:

1. The TPU is reproduced in a large enough quantity so as to provide one for each working position, from the manager to the PDB, warehouse and division.
2. An appendix to the order concerning approval of the TPU gives the schedule of work for its introduction.
3. Regular conferences with the workers are organized, at which they check on the schedule for introduction, reveal incomplete parts of the TPU and give the necessary clarifications. These conferences are frequently held in the form of readings and the acting out of each operation of the procedure with the actual workers.
4. The division for administrative procedures and the divisions for introduction of automated control systems of the plants periodically check on the actual implementation of the TPU, drawing up a report on the established form.

The introduction of TPU's (procedures) is organized as follows:

1. Originals, archive and reserve copies are stored in the archive of the division for administrative procedures.
2. In KamAZ subdivisions accounting points have been organized (divisions and bureaus of automated control systems, authorized workers) to which the procedures division sends the appropriate number of copies of the TPU. The accounting points record the receipt and issuance of TPU's. The accounting point issues copies of the TPU to the users.
3. Under the same policy "News About Changes" to the TPU is stored, accounted for and distributed.

In our practice the average duration of the development of the procedure is 4-5 months. For complex and questionable procedures the development takes up to a year and more. The UOP of KamAZ has now developed large-scale procedures that describe the interactions of the plants, administrations, shops and divisions, as a rule, on the scale of the entire association, and all technological processes have been worked out in detail.

Our most systematic work today is organizational support for the administration for assembling and selling motor vehicles. The complex of the TPU for this subsystem consists of the following documents:

"Control of Assembly of Motor Vehicles";

"Intrashift Control of the Assembly Conveyor and PTK Systems";

"Accounting and Control of the Output of Assembled Motor Vehicles from the Physical Plant";

"Accounting and Control of Parts of Components at the Warehouse for the Exchange Supply";

"Accounting for the Assembly of Components and Motor Vehicles at the Level of the Association";

"Manual Accounting for the Course of the Assembly of Motor Vehicles";

"Stimulation of Synchronous Work of Assembly Productions";

"Hour-by-Hour Dispatcher Control of the Support of the Assembly Production";

"Accounting for the Arrival of Motor Vehicles at the Sales Administration";

"Accounting and Control of the Shipment and Sales of Motor Vehicles";

"The Policy for Submitting Motor Vehicles for Brief Control Tests";

"Elimination of Defects in Commercial Motor Vehicles."

This complex of procedures uses both manual and automated methods of accounting and control, but it is based on a number of problems of the KamAZ automated control system.

The KamAZ experience shows clearly that administrative technology that is documented in the form of a standard administrative procedure, is carefully developed with experimental operation, and is correctly maintained with prompt changes is an effective means of streamlining administration and the best method of providing organizational support for tasks of the automated control systems.

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WASTE-FREE CONSUMPTION SEEN AS LONG-RANGE BUT ATTAINABLE GOAL

Novosibirsk EKO: EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA in Russian No 3, Mar 83 (signed to press 26 Jan 83) pp 151-161

[Article by V. F. Komarov, candidate of economic sciences, Institute of Economics and Organization of Industrial Production of the Siberian Branch of the USSR Academy of Sciences (Novosibirsk): "Waste-Free . . . Consumption"]

[Text] It has become a custom for city dwellers when they go to the store for milk to grab the empty milk bottles. This is apparently why one rarely sees a milk bottle in a garbage can. The "renting" mechanism operates efficiently: when we buy the milk we rent the bottle and leave a deposit at the store. The circulation of the containers has been expediently organized: at the dairy the product is poured into the bottles and shipped to the stores in special boxes, and then the empty bottles are returned to the dairy in the same boxes.

There are no special receiving points and no special personnel. The customer himself returns the container to where he received it since the bottle is frequently more expensive than its contents.

The recycling of glass containers saves raw material, energy and labor, and it prevents littering with broken glass. Can the "renting" mechanism be applied to other mass objects, but for one-time consumption?

What If Newspapers Were Rented?

How frequently people speak and write about the problem of collecting old papers! Paper is the predominant item in the garbage cans of a city building, the trashcans of the squares, parks and streets, and in office wastebaskets.

Let us imagine that you have discovered that a fresh newspaper costs 10 kopecks less. The announcement on the kiosk says that if you give them a newspaper from today or earlier you will receive 10 kopecks for it.

One can assume that within a week at the subway station the following scene would be typical. Some passengers would buy newspapers when entering the subway, and when leaving it they would deposit them in kiosks (and not throw them into the garbage cans). Others, when buying a fresh newspaper would give the kiosk attendant yesterday's newspaper. The kiosk attendant would work as

the salesman of the dairy division does. He would gather the newspapers into standard bundles and put them where the fresh newspapers had just been lying. On the next day he would give them to a truck driver who would bring new newspapers. And on the way to the printing shop the driver would take the old ones to the point for receiving old papers.

In principle, renting is applicable for any paper product for various uses: school children's notebooks, students' notes, Whattman paper, files, albums, wrapping paper, outdated text documents (letters, explanatory notes, instructions, design and technological documentation, bills of lading, orders, instructions and so forth), punch cards and computer printouts.

Imagine that the hiring mechanism worked and more than half of the paper and cardboard that is produced were returned as raw material. Such a quantity of secondary raw material could be an important basis for developing new technologies for the manufacture of paper products from used paper. It would be necessary to have small, but highly productive technological equipment which could be located in places where the secondary raw material was concentrated (at printing offices, communications divisions, large consumers of paper like branch computer centers, and so forth).

Reusable Household Containers

As a rule, canned goods are produced in two kinds of containers: glass and metal cans. Consumers do not have the same attitude toward these. Metal cans go right to the garbage cans, but there is very little glass in them. The reason is clear: glass containers can be returned for the deposit.

Metal cans are good for one-time consumption when traveling. But now most of the canned goods are consumed at home. But there are no special containers on sale for home use. When you open a can with a can opener it is no longer usable. Small design changes could easily change the metal can into a reusable container. Cans which contain coffee, for example, are quite suitable to be filled again.

If metal cans were adapted for repeated use, a hiring mechanism is possible here. Of course it is absurd to transport empty tin cans across the entire country to the "home" cannery. But it is quite reasonable to use them in local industry. But the simple device of using tin cans as secondary raw material has not been organized. And yet tinplate is one of the kinds of metal products that are in shortest supply.

Polyethylene packages, napkins, tablecloths, towels and so forth have become widespread in household use. Frequently groceries are sold in polyethylene packaging. For the consumers the packaging is a reusable item. But for industry it is not. Nobody even mentions gathering polyethylene and using it again. Yet, in the first place, old polyethylene can be used to arrange the production of new products with reduced expenditure; in the second place, the returned polyethylene containers can be used again for packaging other things, say, bulk products; in the third place, while domestic polyethylene waste products do not burn, they pollute the environment for many years (they do not decompose and it is even necessary to look for self-disintegrating kinds of plastic).

As distinct from used paper, reusable containers do not serve as raw material for recycling. Such containers are ready to be used again. One automatically thinks: would it not be possible to print newspapers on paper from which the previous text has been removed and a new one has been printed? In combination with the hiring mechanism, reusable paper promises many economic advantages: there may be "eternal" notebooks, scratch pads and so forth.

A Deposit for Durable Goods

The owner of a passenger vehicle changes the oil in the engine crankcase at least once a year. He pours about 5 liters of used motor oil in the dump (at best, or else simply on the ground). The plastic container is burned (again, at best). Since there are about 10 million private motor vehicles in use in the country, simple calculations will show that we annually lose a minimum of 40-50 million liters of engine oil and 8-12 million plastic containers. Yet engine oil is a valuable raw material for producing a whole range of petroleum products, first of all the oil itself. According to an expert evaluation, 80-90 percent of the initial raw material from manufacturing engine oil can be replaced with used products. One need only introduce a deposit on motor oil and receive it at automotive service stations (AZS) in the same container in which the fresh oil was sold. Then the containers of oil will complete the trip to the plant by the same transportation with which the prepared petroleum products were delivered.

Interesting industrial alternatives open up. Thus small technological installations for rectification of used motor oils can be economically advantageous at territorial petroleum bases or in population points with an excess of labor resources (villages and cities with used-up deposits of minerals, "unpromising" villages, and so forth).

Car owners know how difficult it is to obtain Tosol cooling liquid. And it must be changed every two years. It would be fair to have a policy whereby Tosol and engine oil would be sold only after the used liquid were returned. This would close off the path of speculation and reduce unjustified supplies in private garages.

A couple more examples from automotive practice (although not so obvious). A brake hose has gone out of order. They do not have them in the automotive store and on the open market they cost 3-5 times more than the going rate. And without a hose which costs 3.5 rubles an automobile worth 8,000 becomes a useless toy.

They acquire a new brake hose and throw away the old one. A brake hose is a rubber pipe with a capron fitting and threaded metal tips. In the majority of cases the rubber pipe breaks, but the tips can be used for a long time. Why not return them to the plant? If the used hoses were received by the AZS for only 50 kopecks the car owner would not be slow in returning them. It is understandable that this would have to be on the scale of the country.

The service stations now have a rule: if a part is replaced in the motor vehicle, the old one is returned to the owner. For the majority of parts can be given a second life. For example, oil and air filters. People who know

what they're doing remove the capron filter layer, wash it with soap powder and return it to the plastic base. Why not do this under plant conditions? And the numerous pumps, generators, springs and radiators? An almost deformed semi-axle was returned to me. What do I need this iron for? I threw it away. But is it really easier to manufacture a new semi-axle from special steel, with metal processing, and with wastes, than to straighten out a bend which is unnoticeable to the eye?

It is a rare car owner (motorcyclist, bicyclist) who does not throw away at least one tire that is no longer usable. But there are technologies for recycling rubber. If an automobile tire which is worn out but can be restored were bought for, say, 5 rubles, the driver would not leave the worn-out covering on the side of the road (automobile drivers rarely throw away even empty bottles and glass containers--why not take them and return them?).

Let us look into the storage cupboards of a city apartment, into the shed or attic of a rural home. One can find almost anything here! Old clothing, footwear, trunks, purses, teapots, irons, radios, washing machines, refrigerators, skis, skates, wire, instruments, metal, glass and porcelain dishes, iron beds and folding beds, baby carriages, wooden furniture, oil cloth, door mats, wash basins, children's toys and decorations. Why accumulate so much raw material? It would be a shame to throw away something which has served you for a long time: you might need it sometime . . . but the time comes when there is no longer any space. Then the "trash" goes into the fire or the dump. And there are no less than 80 million of these "warehouses" in the country. Is this not a source of raw material?

I am convinced that if people have something with a deposit value they will bring it to the receiving points. Metal, plastics, wood, leather, wool, cotton, wadding, synthetic glass, porcelain and other materials could become secondary raw material. But this path--transforming things into raw material--is not the most economical. It would be more expedient to give a second life to durable goods or individual elements and components of them.

There is now a policy whereby an old television set can be returned for a small payment. And people return them--this is an example of the way the mechanism of deposits operates. But, unfortunately, such a policy has not been introduced for salvaging old equipment, but for stimulating the demand for new television sets. And old television sets are simply transformed into scrap. There is a lot of mail expressing disturbance about this (addressed, for example, to LITERATURNAYA GAZETA)--a confirmation that thoughtless destruction of products of labor goes against common sense.

Proponents of destroying old television sets assert that their parts are outdated and they cannot be used. It is not understandable, however, how transformer iron or copper wire can become outdated. And what about the polished panels of the body of the television set, the duralumin chassis, the handles, the buttons or the glass bolts of the picture tubes? There are now 75 million television sets in the country. It would take several plants a year just to remove the glass and tin from them. We turn television sets into scrap, which litters the area and, for example, the Telefunken firm has a patent on manufacturing the bodies of the sets from compressed matches that are caught in sewage collectors.

Of course it is more convenient for radio plants to work with raw materials, processed materials and purchased items. To salvage old items means to change the customary technology and there is no motivation for this. But the national economy needs to be oriented toward waste-free consumption. Consequently, it is time to develop these motivations and the necessary organizational measures. As a result there can be a change in the design of durable goods. They will begin to make them in such a way that it will subsequently be possible to disassemble them easily into constituent parts for repeated utilization in production.

The following picture emerges: a coat, a jacket or a skirt can easily be cut into pieces of fabric of the same time (replace sewing with gluing?). The fabric is easily broken down into threads (housewives can reweave them into caftans, scarves and stockings).

Household equipment is broken down into standardized components, some of which (the engine of a sewing machine or vacuum cleaner) can be used again in modernized designs of household machines, while others are turned into initial raw material (metal, synthetic items, wire and so forth). Radical results would be produced here by the principle of equal service life of components and parts of the item. A machine or instrument that has served its intended time all breaks down at once without repair of individual parts.

Worn-out fur items are transformed into raw material for slippers, felt, wool and leather items. Dilapidated materials that cannot be disassembled are used for manufacturing wallpaper, packaging and drapery materials, they are used for warmers, runners, rugs and so forth. Wood scraps are crushed and in small, highly productive installations (in each rayon of the city) are transformed into chipboard slabs. (Tens of millions of Christmas trees alone are burned each year. But what about the furniture, skis, fences, temporary wooden structures and boxes that could be made from them?)

The Overall Concept of Waste-Free Consumption

Let us stipulate that we are speaking only about household construction. Let us divide everything that man consumes into several groups of objects. The first includes products of one-time consumption (food, water, heat, fuel and so forth). We shall leave to the side questions of salvaging the wastes that appear here. Let us include in the second group items of short-term use (newspapers, notebooks, envelopes, various containers and packages, and so forth). The third group is comprised of durable goods (household appliances, furniture, clothing, dishware, footwear, and so forth).

Items of the second and third groups can be offered for rent with a deposit. When acquiring any of these items for the first time the consumer makes a deposit. The amount of the deposit will provide incentive to return the item. With regular acquisition of the item the consumer will either return a similar item that is no longer being used, or make a deposit.

The technology and organization of production of items for short-term and long-term use are being radically restructured. The following principles are being placed at the basis of industrial production:

preferential orientation toward secondary raw material;

plant accompaniment of the item through the entire cycle of its consumption until it is returned for repeated utilization;

designing items so that it is possible to use prepared components and parts of items again after they have fulfilled their consumer functions for the normative amount of time;

planning of technologies not only of production, but also of transportation, warehousing, consumption, collection, and return to the enterprise and preparation for repeated utilization of items that were previously produced.

Of course it is not easy to realize the aforementioned principles because of the stereotypes of production thinking. History includes the following moments: the changeover from hunting and collecting to a reproductive economy became the most important material and technical prerequisite for civilization. Now mankind is faced with a similar problem. Ever increasing expenditures are necessary in order to find and prospect for minerals, and to organize their extraction and processing. So much time and effort has been used to take nature's wealth from her and transform it into objects and good with a limited service time and then throw it into the dump.

"Throw away" production arose and engendered the corresponding ideology in the bosom of the capitalist society. Capitalist production strives to expand the sales market. This is dictated by the law of value. They deliberately reduce the service life of items for the sake of expanded sale of products for one-time use (the "paper cup" concept). Production processes have reached the level of productivity where it is more advantageous to mass produce new watches, machines, mechanisms and dishes than to restore old ones. Another path is deliberate activity to accelerate the obsolescence of consumer goods. Infinite modifications of motor vehicles and washing machines, the cut and style of clothing and furniture force the consumer to reject the old item sooner in favor of a new one. The third path is to use advertising to create new demands for things that are not functionally necessary (luxury items, prestige items and services, and so forth).

Sometimes our purely production goals push the interests of the consumers into the background. Take, for example, the family of Zhiguli motor vehicles, the first model, the VAZ-2101, is an excellent answer to the functional purpose of the motor vehicle as a means of transportation for individual use. The vehicle is easy to drive, comfortable, simple to operate and it has good technical specifications. The latest models have been modified in the direction of increasing the comfort and the technical properties in such a way that certain of their characteristics stand in contradiction to the conditions of operation. Thus the maximum speed of the VAZ-2106 vehicle is up to 152 kilometers per hour and the engine capacity is 80 horsepower. But what if the speed limit in our country is 90 km per hour? It is very uneconomical to drive this vehicle in the city. There are two more questions for the manufacturers of the vehicle: how many resources that are in short supply could be saved if there were two headlights instead of four? And what areas of floors could be covered with rugs that are used on the inside of these motor vehicles. From

the functional standpoint neither four headlights, nor rugs nor 80 horsepower are justified here. Eloquent illustrations of hasty modifications are sometimes produced by the development of computer equipment, agricultural equipment, construction machines and so forth.

The changeover of the economy to conditions of waste-free consumption is a lengthy process. It will be necessary to study and generalize existing experience and to conduct scientific research developments and justification. Such organizational and technical forms as centralized repair of machines, mechanisms and instruments, subscriber service to the population for the repair of television sets, the VAZ system of technical service for passenger vehicles, and various forms of collecting secondary raw material should be carefully analyzed and extended to other groups of products and items. Among the primary issues, one should apparently study the level of supplies of secondary raw material (a kind of nongeological prospecting) and the possibilities of creating small productions in places where this raw material is concentrated. Since secondary raw material is distributed, in principle, more uniformly than natural raw material, there are prerequisites for efficient employment in regions with surplus labor reserves. The specific nature of salvaging secondary raw material itself (its collection, initial processing, preparation, sorting and enrichment) make it possible to extensively draw pensioners, students and housewives into production. With today's demographic situation this factor is of no small importance.

And, of course, there should be systematic research and scientific development of the very concept of waste-free consumption. Will waste-free consumption not be an obstacle on the path of scientific and technical progress? It will be necessary to investigate alternative plans for renovating items. Maintaining durable goods in permanent operating condition through the efforts of the manufacturing plants will make it possible to modernize the designs within a certain, previously established time period, without waiting for them to be worn-out (as is done with the operation of aircraft). This measure will help to provide for the necessary rates of scientific and technical progress.

We have discussed household consumption. But the scope of industrial consumption is much greater than that of household consumption. Still the concept of waste-free industrial consumption is a special subject for discussion. In our opinion, one could profitably use the "hiring" mechanism in a more effective form than they have used up to this point. If a deposit were paid for the machines and materials that are used (if only partially from the economic incentive funds) there would be additional incentive for efficient utilization of production resources.

The concept of waste-free consumption causes us to think in unusual categories and ideas. Many mechanisms of this consumption could be borrowed from nature. There are simply no wastes in the natural environment: leaves, grass and wood are food for micro-organisms; the products of micro-organisms, in turn, provide the nutrition for plants.

The author understands that his suggestions have many weak points. But it would probably be possible to develop less vulnerable plans, and this would be desirable. It is important to think in this direction. Waste-free consumption, like waste-free production, is knocking on our door. Nature herself is prompting us: Look in this direction!

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HISTORY OF INSTITUTE AS PIONEER IN ON-THE-JOB TRAINING CHRONICLED

Novosibirsk EKO: EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA in Russian No 3, Mar 83 (signed to press 26 Jan 83) pp 162-189

[Article by A. G. Malkov: "The Original Production Institute"]

[Text] "From all institutions and enterprises without exception as well as the Red Army, post all former students who have declared a desire to complete their education this year and meet the requirements for admission for intensive studies,"* it was ordered in a decree concerning urgent graduation of engineering personnel which was signed by V. I. Lenin during the days of March 1920.

New technical training institutions were opened up in the country. One of them was the State Electrical Machine Building Institute imeni Ya. F. Kagan-Shabshay. In the opinion of academician M. A. Lavrent'yev, who taught higher mathematics in this institute, its organizer, a specialist in electrical equipment and an engineer, Ya. F. Kagan-Shabshay "understood the main thing: a flow line, standard system is not suitable for producing such a fine 'product' as specialists. An innovative approach is needed here--the enlistment of eminent scientists for teaching and the combination of the students' study with work at the enterprises. The graduates of the institute, in addition to fairly good theoretical training, have production work experience--from the worker to the engineer. Moreover, the training of the engineers cost the state practically nothing, while, say, at the Moscow Vocational and Technical School imeni N. E. Bauman it cost (taking into account stipends for students and wages of teachers) 7,000 rubles." (EKO, 1979, No 8, pp 133-135).

Aleksandr Grigor'yevich Malkov shares his reminiscences of the State Electrical Machine Building Institute. In 1930 he was graduated from the electrical installation department of this institute. He was a shop chief at the Kemerovo electric power station, a head engineer at the Kamyskul'skaya central electric power station, construction chief for high-voltage networks of Kuzbas-set'stroy, and head electrician of the Gurev Sovnarkhoz in Kazakhstan.

*V. I. Lenin on Science and Higher Education," Moscow, "Vysshaya shkola", 1967, p 294.

The author thanks Lev Moiseyevich Zaks and Meri Petrovna Kamysheva who were also graduated from the GEMIKSh [State Electrical Machine Building Institute imeni Kagan-Shabshay], for their active assistance in preparing this essay for publication.

The not altogether ordinary institute, which today seems almost legendary, is located in Moscow on Strastnyy Boulevard in building No 14, was initially called the IIEP (Institute of Engineers and Electrical Production Workers), then the EMIKSh and finally the GEMIKSh, or simply the Shabshay Institute.

The institute was created on 15 November 1920 at a time that was difficult but still glorious for the revolution. It was not until 12 October that year that the war with Pilsudski's Polish troops came to an end, and on 17 November the Crimea was already completely liberated from the White Guard Troops of Baron Vranghel. The revolution moved victoriously through the country, destroying the last strongholds. Russia entered on a path unknown to mankind. The destruction did not impede the birth of new ideas, new forms of life and creativity which were heatedly discussed and actively introduced into all areas of the young society: literature, art, the theater, the secondary and higher schools, families and daily life. In these circumstances of breakdowns and creation the GEMIKSh appeared.

The Founder of the Institute

On the first day of my acquaintance with the institute, at the end of 1926, I met its founder, Yakov Fabianovich Kagan-Shabshay. In the general reception room where incoming students walked, talking with each other, at a simple desk sat a person about 50 years old with an open, energetic face and the sparks of a lively mind in his penetrating eyes, with a shock of dark hair brushed back, and a parted, half gray beard.

I learned later that Yakov Fabianovich was one of the eminent prerevolutionary specialists in the area of electrical equipment. He was born in 1877 into a teacher's family. Having completed the mathematics department of Kiev University and earned the degree of candidate of mathematical sciences, he went to Belgium where he also completed the Liege Electrical Equipment Institute. He worked at Simmens-Shukert plants in Belgium and Germany. He returned to Russia before the revolution. In Moscow he worked at the Westinghouse plant (now the Dinamo plant).

During the last decade before the October Revolution Russian electric power engineering was under the influence of foreign capital, and the majority of specialists were foreigners or Russians who had been educated in Germany, France, Belgium and England.

During this period Kagan-Shabshay did intensive scientific-technical, pedagogical and social work. In 1909 he organized the Moscow Bureau of Technical Research and Consultation (MBTIK) which involved the most eminent electrical technicians of the time: Krzizhanovskiy, Klasson, Shatelen, Voynarevskiy, Aleksandrov, Linde, Eykenval'd and others. Kagan-Shabshay in all ways

publicized and actively contributed to the electrification of industry and daily life. He was assisted by the biweekly journal, IZVESTIYA MBTIK, which he created in 1909 and where he published articles of eminent electrical specialists as well as the results of research and consultations. IZVESTIYA MBTIK was the first to publish an article by G. M. Krzhizhanovskiy entitled "Electric Power Transmission" about the first Russian electric power station that ran on peat in Bogorodsk near Moscow. The station was constructed by the engineers Vinter and Klasson--being the most eminent participants in the development and implementation of the GOELRO plan, the builders of the Kashirskaya and Shaturskaya GRE's and the Volkhovskaya and Dneprovskaya GES's.

One of the areas of Kagan-Shabshay's activity in these years was the analysis of the condition of the production and importation of electric power equipment into Russia and the development of proposals for developing domestic production. He reported the results of his work, "The Russian Electrical Equipment Industry and its Future,"* at the 8th All-Russian Electrical Equipment Congress (1913). It discussed Russia's provision with the main elements of electrical equipment for production, distribution and consumption of electric energy.

Even in the early years of domestic electrotechnology Kagan-Shabshay actively publicized the utilization of electric energy in households. He was interested in conducting research on electric household appliances, published articles and brochures on the subject and then organized under the Moscow Bureau of Technical Research and Consultations an electrothermal laboratory which after the revolution was transferred to the State Electrical Equipment Trust (GET).

Ya. F. Kagan-Shabshay actively participated in public life of Russia at that time. He was a member of the Presidium of the Society of Moscow Electricians, the editor in chief of the society's bulletins, one of the organizers and an active participant in the All-Russian Electrotechnical Congresses and a speaker at the 5th (1907), 6th (1909), 7th (1911) and 8th (1913) congresses. He was the chairman of the technical section of the Society for Economic Rebirth of Russia where they considered and analyzed methods of liberating Russia from foreign dependence during the period of the world war.

At the same time Yakov Fabianovich conducted a large amount of pedagogical work. His talent was especially clearly manifested in the creation of higher electrotechnical courses (1909-1915). He was one of the initiators of their creation and the main ideologist. The courses were created on the basis of a decision of the 5th All-Russian Electrotechnical Congress by a group of outstanding Russian electrotechnicians following the model of analogous higher schools in France and Belgium. At the instigation of the initiators, he was to fill the gap in the education of electricians in Russia and lay the basis for training specialists who were capable of developing production and advancing technical progress. One must say that many ideas from the courses were subsequently utilized by Kagan-Shabshay when creating the GEMIKSh.

*Kagan-Shabshay, Ya. F., "Russkaya elektrotekhnicheskaya promyshlennost' i yeye budushchnost'" [The Russian Electrical Equipment Industry and Its Future], Moscow MBTIK, 1915.

Yakov Fabianovich saw the main goal of his life after the revolution to be to radically change the system of training of engineers and to create a real production institute which was maximally efficient as compared to the existing ones and graduated production specialists which were so needed by the country's recovering industry with reduced expenditures of time and money.

What Kind of Engineer To Train?

Questions of establishing higher technical education during the 1920's and 1930's drew constant attention. There were continuous disputes as to whether specialists of a narrow or broad profile should be produced and whether the "engineering products" that were produced would satisfy the consumer in terms of quality and quantity. The producers, as a rule, asserted that everything was going well with the programs, training plans and time of training (5-6 years), that the VUZ's were producing a high-quality product and that the consumer himself was guilty if he was unable to utilize it properly. The consumer rarely complained about the quality of training of specialists.

The GEMIKSh system proceeded from different ideas: there are no engineers of a broad or narrow specialization, but there are engineers to satisfy one demand of industry and technology or another. Justifying this position of the institute, Ya. F. Kagan-Shabshay said: "In real life we need engineer-production workers who create machines and engineers who utilize them.

"During the prewar period there was almost no need for engineers of the first category since industry itself, especially heavy industry, was poorly developed and the plants were mainly in the hands of foreigners and used foreign technical force while industry was primitive and was satisfied with weak technical workers. Training institutions were oriented toward training engineers of the second category in keeping with the demands of the time.

"Now the picture has changed sharply: industry has almost ceased to use foreign technical force and questions of production efficiency, increased labor productivity and improved quality have placed an enormous demand on present engineer-production workers. And it has turned out that the producers of the "engineering product"--the existing VUZ's--were not fully ready to satisfy this demand. But they tried to convince the new consumer that their product was universal and, consequently, suitable for any purposes.

"But the GEMIKSh asserts that for the new purposes it is necessary to have a specially arranged production, which it is carrying out."*

Specialists with higher electrotechnical education were critically needed in industry. This was shown, in particular, by this example. At four of the largest electrical machine building plants in Moscow, Leningrad, Kharkov and Barancha in the Urals in 1927 there were more than 200 masters who were technical managers. Not one of them had a higher education. There were more

*Quoted from documents and manuscripts, unless especially stipulated, taken from the institute's collection published in 1928, "Seven years of the GEMIKSh".

than 150 designers working in the design bureaus of these enterprises. And almost all of them were without a higher electrotechnical education as well. The methods of management used by certain old masters were discussed humorously in the collection of stories published in 1925 by the writer Panteleymon Romanov: "After the masters had been strictly forbidden to use censored expressions and shouts, labor productivity dropped sharply!"

Ideas of Streamlining the Higher Technical School

The GEMIKSh was based on the following principles, arrived at by the organizer having worked 25 years in production and science.

A higher technical educational institution should operate like a plant that produces products of a necessary quality and purpose with reduced production costs.

An engineer should be trained and educated directly in production.

Having completed the institute, an engineer must immediately begin to work as an experienced specialist and not lose time by starting from zero in mastering the necessary specialty and production as a whole.

The mastery of production should begin with the first days of training the student, and not 5-6 years after he has completed training.

Throughout the entire period of training the student should be a productive member of society. Working in the sphere of material production, he reduces to a minimum expenditures on his training.

At the plant the student can be regarded as a full-fledged participant in the production process, and not as a probationer of the institute who is an impediment to the normal production rhythm.

Not every person, even one who is sufficiently capable and technically educated, is suitable for effective work in production.

During the time the student works at the enterprise there is a natural selection of production workers. Those who are unsuitable or not steadfast weed themselves out or should be promptly "rejected" in their own interests.

It is known that students work actively in the institute mainly during the time of preparation for examinations. This leads to a senseless loss of a considerable part of the year. Therefore it is necessary to divide the annual training into several (say, 3-4) independent courses, with examinations when transferring from one to other. With the introduction of several courses the student who has failed at one or two subjects will not lose an entire year.

The time allotted for the basic subjects in engineering training such as mathematics, mechanics, electrotechnology, the resistance of materials, parts of machines and also special subjects should be increased, and the time allotted for secondary subjects should be essentially reduced.

The institute should use laboratories and technological equipment of plants as real training and visual aids for the students.

During the process of training and work at the plant one reveals the student's inclination to one specialty or another. One should develop his production initiative and love for creativity and enlist him in public measures of the enterprise.

The subjects of diploma projects should be those which can be used to improve production.

The institute should participate in the production life of the plant through its students and teachers and help to solve plant technical problems.

The Structure of the Institute

The organizers of the GEMIKSh set for themselves the goal of staying together and training electrical machine builders and electrical installers (and not simply all kinds of electricians), proceeding from the requirements of industry.

What did these requirements consist of? Above all to comprehend clearly and to feel that daily situation in which the engineer must function. And so the polishing of the "product" under real conditions of production life is a basic task of the institute. To carry it out it must be closely related with real commercial (and not training-demonstration) plants, where the students participate in production continuously, responsively and actively, becoming a part of the plant organism. The polishing should be done methodically calmly, during a time interval that is sufficient to educate a person. Kagan-Shabshay's personal plant experience showed that this takes from 2-3 years, during which no less than two-thirds of the time must be devoted to this polishing.

The GEMIKSh initially organized only two electrotechnical departments: electrical machine building and electrical installation. In the former the students were trained for two years and the training was divided into six independent courses, each taking four months. In the electrical installation department training included 7 courses and therefore the time period was increased to 2 years and 4 months. In addition to the basic courses a military artillery course was introduced.

Because of the critical need of industry, subsequently another department was opened--the machine tool instrument department with a two-year training period. In 1933 on the basis of this department Yakov Fabianovich created an independent machine tool instrument institute. It grew rapidly and is now one of the leading VUZ's in the country.

The academic year in the institute lasted only 4 months. Therefore throughout the calendar year there were three new classes: on 15 July, 15 November and 15 March and also three graduations.

The entrance exams to the GEMIKSh revealed the capabilities and inclinations necessary for developing an engineer-electrotechnician. The examinations in mathematics were distinguished from those of other similar VUZ's by their greater difficulty. Moreover there was an exam in physics and a conversation on social sciences where questions were asked on various subjects in order to determine the erudition, the "public image" and, to a certain degree, the quickness of the applicant.

According to data for 1924-1927 the proportion of applicants who were accepted amounted to an average of only 18 percent. Each new class included about 50 people.

The students were subjected to further testing for endurance in the first course, which was considered a trial course. In all the subsequent courses they were tested in work: with labor discipline and a large load. Those who were unable to complete the first course successfully were weeded out. They were not allowed to repeat it. They could repeat subsequent courses, but not more than twice, so that they did not remain in the institute for more than three years.

Students at Plants

Four days a week the students at the institute worked in plants. They were sent there not to learn a trade (this was an additional effect), but to become accustomed to the strict, responsible plant discipline and to the hard physical labor, and to feel that they were an organic if insignificant part of the production as a whole. Moving from shop to shop they not only assimilated (sometimes even unconsciously) the production connection between various parts of the technological process, but also were imbued with the production psychology that exists under plant conditions.

Having worked as an assistant to the worker, the student became an assistant to a master and then to an engineer, and gradually was assigned to engineering and administrative personnel in a hard real-life production situation. The student's on-the-job training ended in the planning and design bureau, in the division of the head technologist for the planning division. They worked under the motto: "Everything for the plant, in the interests of production." To be first to start working and the last to stop--such was the rigid, but very useful schedule of the institute. And this was called an organic link with production.

Of course the continuous work of the students in production not only trained, but also educated them: they saw the details and felt with their own hands everything that is usually transmitted in lectures in the form of purely verbal constructs and descriptions accompanied by photographs, blueprints and diagrams, which do not remain long in the memory since they are not experienced concretely.

The convenience of the method consisted in that the young people who were thrown into real plant life, within a couple of months (and not years as with

the usual system of technical education) already had a real sense of where they were.

And the principle of selection of the most steadfast and strongest workers for production was realized of its own accord. During the time they were in the institute the students struggled for their existence as production workers, for they not only studied, but also lived in a real production situation. This struggle tempered them and made them extremely active both during training and after its completion.

It should be noted that in spite of the severe plant conditions, there were extremely few who left the institute of their own accord. They were mainly physically weak people or family people whose material situation could not be supported by the stipend. Much more frequently it was necessary to eliminate them because of academic or plant failure.

Ya. F. Kagan-Shabshay had an extremely skeptical attitude toward statements about the effectiveness of training laboratories and thought that the student should acquire real work experience in the area of measurements and testing in plant laboratories and at experimental stations during the process of production training.

A Typical Statement of Opponents of the GEMIKSh System:

"A training institution without laboratories cannot be considered a VUZ. Plant laboratories and equipment can in no way replace even the most meager training laboratory for the problems solved at plants have nothing to do with the development of scientific thinking and education of the students."

Without denying the need for laboratories in the institute, Yakov Fabianovich tried to make them research laboratories. Students who were inclined to scientific research activity and also graduate students and teachers should work in them. This is precisely the role that was played by the electrothermal laboratory which he managed.

Students in Shabshay's institute worked in plants year around. Graduates of other training institutions, extremely overloaded with theoretical disciplines, did not have this chance. And those months, as a rule summer months, which were devoted to practice produced little either for the students or for the plant. The training excursion nature of this practice forced the plant administration to regard the load related to its organization as a charity which was both burdensome and useless.

From a speech by the secretary of the party organization of the Dinamo plant, Mikroshkin, at a meeting of the industrial-technical commission of the VUZ conference under the Moscow committee of the Russian Communist Party (of Bolsheviks), 1924:

"In our plant there are many students from various institutes of Moscow and Leningrad. I shall tell you how they work, in particular using the example

of the institutes of Karl Marx and Lomonosov. The students themselves do not carry out their program, but come to the head engineer for information. He has neither the time nor the energy for this. Then they come to the director who sends them to the party bureau. And we also tell them that we will give them no information since they have come to work for three months in the shop and not to gather information, to look and ask questions. It is necessary to penetrate into the work, to understand and to feel how machines are assembled and this is what student trainees do not do, with the exception of one or two. The workers look on them as people who have come for no reason. Judge for yourself: when the trainees are asked, for example, to run a wire, they are afraid to touch it because they might get their hands dirty. The majority of them are afraid of physical work. They do not penetrate into the essence of the matter and therefore instruments are not entrusted to them.

"Shabshay's students are oriented toward production--this is apparent immediately. Having certain ideas of how a machine is designed and constructed, they not only help the workers and technicians, but also work in their absence. These people have the fiber of a worker, are zealous about their work, and the attitude toward them is quite different."

What and How To Teach?

Under the conditions of the reduced training period and the lengthy work time of the students in production, it was of primary significance to have efficient arrangement of the training plan and programs of the disciplines that were taught. In his personal experience and also when analyzing the situation for training of specialists in Russia and abroad, Kagan-Shabshay came to the conclusion that the main thing is not to give the student the maximum quantity of knowledge, but on the basis of fundamental theoretical education to teach him to think logically for himself and to apply scientific knowledge creatively. Therefore he considered the basis of education for the engineer, for example, the machine builder, to be mathematics, theoretical and analytical mechanics, and the theory of electrical machine building, which included theoretical electrotechnology.

The course in mathematics at the GEMIKSh was on a university level. The mathematics department was one of the strongest in Moscow. Working in it were such eminent mathematicians as M. V. Keldysh, M. A. Lavrent'yev, A. M. Tikhonov, I. A. Sveshnikov, S. P. Finikov, I. I. Zhegalkin, V. N. Deputatov, and I. F. Sludskiy. Theoretical and later analytical mechanics were taught by A. L. Lavrent'yev (the father of M. A. Lavrent'yev) and V. V. Dobrovolskiy. The course in electrical machine building was given by Ya. F. Kagan-Shabshay himself, who enlisted the most eminent specialists in industry. One must say that the principle of enlisting eminent industrial specialists to work in the institute was one of the main ones in the GEMIKSh.

While in the first courses mathematics and mechanics played an auxiliary role and served as a basis for teaching special subjects, in later courses they were taught as independent courses, pursuing the goal of instilling in the

future engineer the ability to think analytically. As distinct from mathematics, individual sections of physics were given in the corresponding special disciplines. Thus the necessary information about electricity and magnetism was given in the course in electrical machine building, and information from thermal physics--in the course in electrothermal equipment. Academician P. P. Lazarev taught physics for several years.

Beginning with the first days the students became accustomed to seeing real things in plants and seeing them in schematic diagrams in lectures. With the continuous work in production, the program was relieved of excessive overloading with illustrative material. This reduced the descriptive-demonstrative part of the subjects. The lecture time was reduced, which was advantageous both for the teacher and the student since main attention was devoted to the logical side of the discipline being studied: the subject became more compact, interesting and graspable since it was clearer to the student in its totality. True, with this system the lecturer had to develop his subject with deeper logic. The requirements on him increased: for he was dealing with a more prepared audience which asked numerous specific questions arising from the plant situation.

One must say that the teachers certainly did not always work at the GEMIKSh because of high wages. They liked to give lectures in the institute where they had maximum possibilities of creative work.

N. M. Sokol'skiy, director of the cable plants who gave the course "Cable Production" in the GEMIKSh, speaking at a meeting of the industrial-technical subcommission of the VUZ conference under the Moscow committee of the Russian Communist Party (of Bolsheviks) said:

"All my lectures on cable production were compressed into 30 hours. If I had given them as is done under the current policy of technical education I do not think that 120 hours would have been enough.

"It is known that any course can be divided into sections: descriptive, analytical and practical. I do not give the descriptive parts since the students have already been at cable plants and become familiar with machine tools, their operation and everything else.

"When they come into the lecture room, giving them lectures is nothing but satisfaction because it is a lively conversation among people who are highly interested in the subject and ask interesting questions, people who think in images and not symbols and not indistinct outlines of instruments and machines.

"Here is the answer to the question that bothers many people: how can Shab-Shay's students receive such an immense mass of information in such a short amount of time? They receive and, moreover, profoundly assimilate this information because it is not given in a remote and abstract form, but in the process of solving production problems."

The theoretical work in the GEMIKSh proceeded just as intensively as the production work did. For two days each lasting ten hours the students studied continuously in the institute, with 7 hours of lectures and 3 hours of drawing and design. The academic hour is 55 minutes and not 45. There were no test periods since this would mean that all the rest of the time the students could do nothing. The continuous work was ensured by the fact that the subject that has been covered or the part of it that has been completed was left behind immediately. Those who failed to attend 20 percent of the lectures without a good reason were dropped from the first course and in subsequent courses they were left to repeat the course.

After two or three years of training, the GEMIKSh system provided almost the same theoretical preparation as in classical VUZ's that were based on 5-7 years of theory. The explanation for this again is the essence of the method itself, and the efficiency of the training plan and programs.

In order to know whether the necessary volume of information was firmly assimilated in such a short period of time and if the training of the engineers was of a high quality, let us turn to the opinions of specialists.

P. A. Maksimov, director of the Dinamo plant, 1924:

"Two years of cooperation between high theoretical training in the institute and production work at the plant transformed Shabshay's students surprisingly rapidly into real engineers who were capable of solving design, calculation and production problems. They take on all work and do it so well that now it is extremely difficult for me to do without them."

S. Ya. Kupidonov, scientific expert of the Main Administration of Vocational Education, 1925:

"The diploma projects of the students reveal the ability to seriously design and test machines independently, without any imitation."

B. D. Klark, head engineer of the Dinamo plant, 1925:

"At the present time there are more than 100 students of the GEMIKSh working at the plant. They justify their rate of the 6th category because they have actually worked 90 percent of the days. Moreover some of the students are already working in responsible jobs in the technical bureau and in other divisions of the plant, considerably increasing their salaries in the 6th category, which more than makes up for the lacking 10 percent."

Kantor, chief of the technical bureau of the Dinamo plant, 1925:

"During the course of prolonged practice, gradually going through almost all the shops of the plant and the technical bureau the GEMIKSh students end up being completely prepared for carrying out our assignments. They are sharply distinguished from young engineers who have completed other training institutions. GEMIKSh students are also well prepared to handle questions that require a relatively large amount of theoretical knowledge."

I. I. Vlasov, director of the SVARZ car repair plant, 1927:

"If one looks at the work of engineers who have completed VUZ's and have ten years of practice working in one technical division or shop or another and compares them with graduates of the GEMIKSh with 1.5-2 years of experience, one can state with confidence that there is no difference between them in terms of the quality of the work that is performed."

M. I. Vayner, who completed the GEMIKSh in 1926, 1982:

"Within three years after completing the institute, having worked as an engineer in the distribution bureau and production division, and as chief of the planning bureau, I began my many years of work at the Elektrosila plant in the position of commercial chief of shop B. Once I repaired a motor whose defect the shop chief could not determine. For this they appointed me, a woman, as the chief of a shop that produces 700 motors a month. And within six months the shop was producing 1,500 motors. I explain this by the fact that in addition to theory I was quite familiar with production."

B. S. Verner, completed the GEMIKSh in 1929, 1982:

"Having been graduated from the installation department, I worked as a supervisor for installing electrical equipment in the smelting shop, chief of the installation division of the Central Asian Branch of GET, and then as chief of the electrical shop and head power technician of one of the aviation plants. During 50 years of work as an engineer and manager of large production subdivisions I have occasion to meet graduates of many vocational and technical training institutions. I can confidently say that not a single one of them were graduated as engineers who were ready to begin work as production managers immediately after graduation. I experienced the advantage of a close link between training and production work for myself. Therefore I am convinced that by creatively utilizing the principles of the GEMIKSh system one can train engineers who are real production commanders."

Opponents of the GEMIKSh system have asserted that people who have completed such a training institution are narrow specialists who will not be able to display any independence when there is the slightest deviation from one area for which they were trained. Is this the case? This assertion has been refuted by life itself. I shall name only a couple of the hundreds who have been graduated from the GEMIKSh.

I. G. Kabanov held the post of the director of the Dinamo plant and then became minister of the electrical equipment industry, chairman of the Gosstab and minister of foreign trade.

V. N. Gorkin was head engineer of a plant for automotive-tractor electrical equipment, R. A. Nilendr--head engineer of an electric light plant, and S. I. Rabinovich--head designer of a transformer plant.

G. V. Yeremeyev was in charge of the main administration of the Ministry of the Ship Building Industry, and A. V. Mirolubov--of the division of remote

transmission of Energoset'proyekt. Doctor of technical sciences S. A. Sovalov worked as deputy head dispatcher of the USSR Unified Energy System.

N. I. Bulgakov was for a long time in charge of designing special transformers at the Transformator plant and then worked as deputy head designer for the scientific section of this plant.

Practically all of the powerful and ultrapowerful GES's and AES's of the country passed through the hands of B. S. Uspenskiy. His engineering activity was constantly alternating with planning work and participation in the construction of energy facilities. He was an expert participant in the plans for the development of the YeES SSSR and OES of individual regions for various five-year plans. He worked as head electrician of the Gidroenergoprojekt Institute.

S. G. Shur worked as the head design engineer in the Energoset'proyekt Institute. Under his leadership plans were drawn up for 500 kilowatt power transmission lines which provided for the development of the Consolidated Energy System of Siberia.

A. P. Al'tgauzen was head of the All-Union Scientific Research Institute of Electrothermal Equipment, L. M. Zaks--the All-Union Scientific Research Institute of Physico-Technical and Radio Technical Measurements, and Yu. V. Koritskiy was deputy director of the All-Union Electrotechnical Institute imeni V. I. Lenin.

The following doctors of technical sciences are personnel managers: M. A. Bykov in the Moscow Mining Institute, B. B. Gal'perin in the Moscow Institute of Steel and Alloys, G. I. Kitayenko in the Leningrad Electrotechnical Institute imeni Ul'yanov, and A. D. Stepanov and P. M. Tikhomirov in the Moscow Energy Institute.

Is the Tension Not Too Great?

The work week in the institute amounted to about 60 hours and the year had 42 work weeks (in the MVTU--37). They had every Sunday off, two weeks in the winter, two weeks in the spring and a month in the summer.

What did the students think of this load? When they were physically working in the plant for four days, they finally began to long for their lectures, they tore away from the plant and went to the institute, they zealously threw themselves into their studies, and within two days ran back to the plant. During the four plant days the brain "cooled down," and the knowledge was digested and compacted.

Speaking at a meeting of the industrial and technical commission of the VUZ conference under the Moscow committee of the Russian Communist Party (of Bolsheviks) in 1924, a GEMIKSh student, S. I. Rubinshteyn, said:

"During our four days at the plant a number of production questions arise. We are not at all sick of the plant, as many people say here, but we are drawn to solving the production problems that arise. In the institute we are

not tired out by two days of hard work. And they are wrong who think that we study only logic which causes a headache. In training we have achieved if not completely at least to a large degree that method which cannot be called lecture or practical, but theory which is always interwoven with practice."

In order to prove that in the severe tense situation the GEMIKSh students had at least no worse health than those who studied in somewhat easier conditions of other VUZ's, the institute conducted medical examinations of the students, and their results were published for general consideration.

I shall discuss one of them which was conducted during March which is unfavorable for the health. The premises of the institute were considerably worse from a sanitary and hygienic standpoint than those of other Moscow VUZ's. The examination was conducted by the Central Health Control Commission of the Moscow Health Division.

This commission came to the conclusion that about 77 percent of the students were actually healthy, and those who had health problems had them before entering the institute, and the health of students in the senior courses was no worse than that of those in the junior courses.

The GEMIKSh System--A Real Embodiment of a System of Economy

Ya. F. Kaban-Shabshay, having set as the goal of his life to organize a production institute, was afraid that the attempt to do it at state expense would involve the destruction of the idea itself in the maze of offices and commissions. Therefore he decided initially to establish the VUZ through his own efforts and only after having shown the "commodity" to an advantage, to ask for official recognition and transfer it completely over to state maintenance.

From the reminiscences of Kaban-Shabshay:

"In the beginning of its existence (a little before 1923) the institute not only did not receive support (material or moral), but did not even evoke simple sympathy. The method of education was new and incomprehensible, and the claims (to train an engineer in 2-3 years) were simply offensive to all who by the usual standard had to spend 5-6 years and more on training, and the material situation was simply wretched, with a complete lack of confidence in tomorrow. But in spite of all these extremely unfavorable circumstances, the training institution survived and our practice was recognized. The explanation can be found in the fact that the idea on which it was based was correct and viable and there was a steadfast if small contingent of energetic people who devoted all their efforts to the struggle for the realization of this undertaking."

The founder of the institute and his supporters spared no efforts or time in order to prove that streamlining training in the GEMIKSh would lead to a reduction of expenditures and increased efficiency of the training of an engineer. And this ensued from the essence of the system and not from deliberate economizing.

There was no need for costly expenditures on training shops, equipment, operational outlays for service personnel or current expenditures since these were provided by the plants.

With this system the training institution had not only its own teachers, but also a much larger number of plant personnel: draftsmen, designers, engineers, masters and workers with whom the students worked. It is typical that they required no money from the institute and no additional expenditures from the enterprise since they worked for the direct purpose and in a natural, unnoticeable way were also used for training purposes. The same thing can be said about plant equipment, laboratories, drafting bureaus and so forth.

With the GEMIKSh system the students working in production paid for their own maintenance (a living wage) and helped to create material values. The plant received not trainees who were an additional burden for them, but a useful (especially with shock assignments) fresh, young, disciplined, easily transferred labor force. One might also say in passing that without additionally straining themselves materially, morally or administratively, they helped to create plant engineering personnel.

The institute's main regular fund was comprised of the earnings at the plants of 60 of the students who were paid in the 6th category, regardless of the work they did and for the actual amount of time worked. The labor of the remaining 40 percent was provided to the plants free of charge. They received all the money for the retirement fund and placed it in a general fund which was then distributed for stipends, payment for the teachers and current expenditures. The stipends were distributed by the student bureau. About half of the students received them. The amount of the stipend depended on the course and the material situation of the student, but it was less than the stipends in other VUZ's.

Beginning in 1925 the State Electrotechnical Trust (GET) became the main source of finances necessary for the institute's operation. It was the main one, but not the only one, since Kaban-Shabshay as its founder continued to invest his own funds, which consisted of honorariums for expert opinions and consultations as well as payment for orders from Glavelektro that were filled by his thermo-electrical laboratory. These funds were frequently not enough, and then part of his private property was used as collateral or was sold.

The Struggle for Official Recognition

In June of 1926 the Main Administration of Vocational Education of the Nar-kompros officially recognized the institute for the first time and approved its charter.

But workers of the scientific and technical section of the Main Scientific Council (GUS), having refused in 1925 to recognize the institute as a VUZ, continued to zealously defend their point of view. Because of this the struggle for recognition of the institute flared up with new force. The discussion regarding this issue was carried out at a fairly high level and sometimes was extremely heated.

From the minutes of the meeting of the board of the presidium of the Narkompros on 11 October 1927:

Cherdantsev (professor, GUS): Many examples concerning electricity that were presented in the institute's bulletin demonstrate the inadequate education of the author. It is written here point by point what they really are.

Shabshay: Who wrote this? And what?

Lunacharskiy: In the bulletin next to these examples and problems is written "Nonsense" . . .

Shabshay: Who wrote this?

Cherdantsev: I would not like to name the individual, but I might say in passing that physicists from the scientific section of the GUS

Shabshay: Have the courage to say directly who wrote this?

Cherdantsev: Well, say I did.

Shabshay: You? But you are a complete ignoramus, both in electrical machine building and in production!

Cherdantsev, turning to Lunarcharskiy: Anatoliy Vasil'yevich, what is this? In 20 years of teaching I have never encountered such behavior.

Lunarcharskiy: I do not see why a person should not sharply defend his opinion here.

Cherdantsev: In that case I will leave the meeting.

Khodorovskiy (chief of the Glavprofobr): Here they have told us that the institute has some approved charter. We did not approve any charter!

Grant (GEMIKSh): Anatoliy Vasil'yevich, I do not agree. I can quote by heart from protocol No 35 of the board of Glavprofobr: "We have heard about the charter of Shabshay's institute. We have decreed to approve the charter."

Khodorovskiy, stopped short: I said that we have not approved the charter. It turns out that we have approved it. But it does not say there that the graduates are to be given the title of engineer. And this is the main thing. Therefore I propose that we agree with the opinion of the GUS and put an end to this matter.

Matlin (member of the board of GET): I have a certain opinion about more than 70 graduates of the GEMIKSh. I must say that all of them are working at plants in engineering positions and are performing their duties excellently as compared to the graduates of other VUZ's, with whom we frequently do not know what to do: the people who have completed the GEMIKSh are engineers--this is the opinion of GET.

Khodorovskiy: Is their theoretical training adequate?

Diner (chief of the masters of the Dinamo plant): It is not only adequate, but they are able to use it in production, which cannot be said of people who have completed ordinary VUZ's. Setting aside "charges" and "defense" of the institute, I will say that I myself am a representative of the classical school. I was graduated from the Leningrad Polytechnical Institute and have been working for about 20 years as an engineer in production, and this is precisely why I was extremely surprised by the attitude of Glavprofobr toward the institute.

Lunacharskiy: I agree with the representative of GEMIKSh that it is necessary to have a natural competition of the two types of engineers which are trained by Shabshay's institute and other VUZ's. But since we have no name for the specialists who are graduated by GEMIKSh, for the time being we will have to call them technicians.

As a result of this meeting and the arguments that were conducted in it, a decision was made: to confirm the opinion of the scientific and technical section of the GUS, considering the institute a tekhnikum, and to transfer it from the division of higher educational institutions to the jurisdiction of the division of tekhnikums. This decision actually repudiated the decision of the Glavprofobr of 4 June 1926.

If one looks at the subject of the dispute from the outside it is quite clear that the argument took place between the consumer and the producer of the "product"--personnel specialists. The consumer--the State Electrotechnical Trust--demanded that the quality of the specialists trained for it correspond to its demands and that it itself evaluate the level of their training. The producer--the Main Scientific Council of the Narkompros--refused to regard the needs of the consumer. After all this "product" was paid for not from their pockets, but from the state pocket and without fail. And the producer also criticized the product of the "competitor" which was in greater demand, abusing the OTK stamp that was in its hands in order to sharply reduce the evaluation of its own firm interests.

Naturally the consumer protested against this decision.

From a decision of a conference of representatives of the GET, the Dinamo, SVARZ and Transformator plants and the Moscow association of electric lamp factories which took place on 17 October 1927:

"Having heard the report on the meeting of the board of the presidium of the Narkompros of 11 October 1927 regarding the question of the GEMIKSh, the conference states that people who have completed this institute hold engineering positions in the electrical equipment industry. The quality of the work they do satisfies industry.

"Therefore the branch is interested in protecting the GEMIKSh, which produces skilled personnel.

"The campaign of attacks on the institute is inadmissible. We turn to the Narkomat of workers and peasants inspection with the request for an investigation of this.

"In order to better provide for the interests of the branch, we ask the presidium of the VSNKh to accept the GEMIKSh under the jurisdiction of the division of vocational education, having created the appropriate commission for this with the participation of representatives of the electrical equipment industry."

The decision of the conference was supported by the presidium of the VSNKh. The appropriate letter with the signature of its chairman, V. V. Kuybyshev, was sent on 5 November 1927 to the board of the presidium of the Narkompros. As a result, the institute was kept in its former position as a higher educational institution and continued to produce skilled electrical machine building engineers and electrical installation workers in increasing numbers.

Before the beginning of the plenum of the Central Committee of the All-Russian Communist Party (of Bolsheviks) in July 1928, representatives of the institute headed by Kagan-Shabshay were received by I. V. Stalin. He discussed with them the problems of reorganizing the higher school, training of specialists, time periods for their education and so forth. The results of the discussion were reflected in a speech at the plenum, "On Improving the Training of New Specialists."* I. V. Stalin approved the idea on which the activity of the institute was based and expressed the opinion that it was time to extend its experience everywhere in various branches of industry.

From the paper, "Electrotechnical Education in the USSR," at the second world energy conference in Berlin in June, 1930:**

"The years 1929 and 1930 in the Soviet Union are a transition period from old forms of higher technical education, which were separated from the life of the enterprises, to new ones which are dictated by the requirements of the plan that is being implemented for reconstruction of the national economy. The general line here is to reduce to a minimum (3 years) the time the students are in the VUZ and to bring theoretical teaching as close as possible to practice in production (cooperation between the school and production).

"Interesting experience in organizing a new electrotechnical school, which is organically connected with production and free of the traditions of old schools, has been accumulated by the Electrical Machine Building Institute in Moscow which was founded in 1920 by Ya. F. Kagan-Shabshay. The ten years of the existence of this institute have provided rich material for solving various problems related to the new system of electrotechnical education in the Union.

*"Resheniya partii i pravitel'stva po khozyaystvennym voprosam" [Decisions of the Party and Government on Economic Problems], Vol I, Moscow, "Politizdat", 1967, pp 744-750.

**"Doklady SSSR na vtoroy mirovoy energeticheskoy konferentsii v Berline v iyune 1930 goda" [USSR Papers at the Second World Energy Conference in Berlin in June, 1930], Moscow, Gosizdat, 1930, pp 270-272.

"Because of the shortage of engineers in the electrotechnical specialty in the USSR, in 1930 an institute was organized in the region of Dneprostroy along the lines of the Electrical Machine Building Institute imeni Kagan-Shabshay, and also several new industrial and technical schools in other specialties near large industrial enterprises that are being created."

The GEMIKSh has existed for 13 years. Many of its opponents have not been able to coexist with their successful competitor. Therefore they have constantly raised the question about its "harmful" activity and tried to close the GEMIKSh, not thinking about the deliberate damage which would thus be caused to the national economy.

In September 1931 Yakov Fabianovich was promoted to management work in the Narkomat of heavy industry for organizing throughout the country special purpose faculties (FON's). The first such faculty was created under the GEMIKSh. The FON's made it possible during the years of the first five-year plan within short periods of time to provide an engineering education for industrial leaders who had been advanced from professional revolutionaries and workers. These were faculties under higher educational institutions that produce engineers with a clear-cut specialization.

Associated with Kagan-Shabshay's name is the creation in the country of the first plant-VTUZ's and enterprise-schools at the Leningrad metal plant, at the Serp i Molot plant in Moscow, at the Dneprovskaya and Shterovskaya electric power stations, at the Kadiyevka mine in the Donbass, and at the Perm machine building plant.

From a letter from G. M. Krzhizhanovskiy in the central committee of the All-Russian Communist Party (of Bolsheviks), "On the Shterovskaya enterprise-VTUZ":

"In 1930 at the Shterovskaya state electric power station on the basis of the electric power station faculty of the GEMIKSh, the only enterprise-VTUZ in the Energotsentr system was organized. At that time this experimental training institution was provided with all the necessary conditions for successful development.

"During the first days of August I had the opportunity to familiarize myself in detail with the work of the enterprise-VTUZ and I came to the conclusion that the experiment in creating such a school has completely justified itself.

"Not even to mention the fact that this school provides under the conditions of the Donbass the possibility of training personnel without any leave from production, is a stimulus for attracting labor force and almost completely precludes their turnover--the specialists who are trained even during the process of training itself are of immense advantage to the enterprise. There is no doubt that each of them that has completed any level of the enterprise-VTUZ will immediately be able to successfully carry out the corresponding technical duties in production. Moreover the cost of the training is considerably less than in the ordinary VUZ with leave from production.

"The last decree of the SNK RSFSR about the unified system of training personnel envisions the organization of a system that is very similar to the enterprise-VTUZ at the Shterovskaya GRES.

"Based on these considerations I request that assistance be rendered in revoking the preliminary decisions regarding reorganizing this enterprise-VTUZ into factory-plant technical courses, thus offering us the opportunity of accelerating the development of this experimental training institution."

Chairman of Energotsentr
15 August 1931

Krzhizhanovskiy

In 1932 Ya. F. Kagan-Shabshay in his report to the central committee of the All-Russian Communist Party (of Bolsheviks) argued his idea about organizing physico-mathematical faculties under VUZ's in order to train engineer-scientific workers, which anticipated the organization of such institutes as the Moscow Engineering-Physics Institute and the Moscow Physics-Technical Institute. The organization of the training process in the MFTI is close to that of the GEMIKSh: an organic, continuous link between production and base scientific research institutes, for which personnel are trained and where students start working with the second or third course; high requirements for the "raw material" given to the institute--the students; a high level of training in fundamental disciplines; the striving to teach future specialists to think and work and not to cram a maximum amount of knowledge into them, and so forth.

And at this time a new administration of the GEMIKSh, which included opponents of the new form of VUZ education, Glovatskiy, I. A. Cherdantsev and others, began to reorganize it, violating the principle of the organic link between training and production. In 1933 the institute was closed and its building along with the remaining teachers and students of the first six newly introduced semesters were transferred to the Moscow Institute of Communications. The students of the senior (7th and 8th) semesters were transferred to the Moscow Energy Institute.

During the years of its existence the GEMIKSh graduated several hundred highly qualified engineers who were trained and educated in production with minimum state expenditures.

Among the graduates of the institute are the most eminent specialists in the electrical equipment industry, whose names are associated with the development and assimilation of progressive designs of Soviet electrical machines and equipment, high-voltage transformers, electric lights, cables, and insulation materials: they include planners and builders of the largest electric power stations and power transmission lines; there are eminent scientists, designers and managers of ministries, main boards, scientific institutions, VUZ faculty, and winners of Lenin and State prizes.

There is no doubt that the appearance and flourishing of the GEMIKSh were conditioned to a certain degree by the peculiarities of the 1920's and 1930's when the reborn, revamped and rapidly developing industry critically needed

engineering personnel, the VUZ's left from Tsarist Russia could not satisfy this need and accept all candidates, and the country was poor and it was necessary to save on everything.

Under these conditions the ideas of Ya. F. Kagan-Shabshay which ensued from the task of training specialists in the shortest possible period of time for the rapidly developing industry turned out to be especially effective.

During the next 50 years the situation in the country changed radically, and our higher schools underwent immense changes.

It seems that the short but brilliant history of the GEMIKSh, its research and experiments can be useful even today when selecting ways of improving the system of higher education and providing for the training of skilled, creative personnel who are capable of independently developing technical equipment and production and advancing scientific and technical progress. Ya. F. Kagan-Shabshay, the organizer of the GEMIKSh devoted his entire life to educating this kind of personnel.

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PROBLEMS OF INTRODUCING IMPULSE CUTTING MACHINES DETAILED

Novosibirsk EKO: EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA in Russian No 3, Mar 83 (signed to press 26 Jan 83) pp 190-197

[Article by Anatoliy Shakhov, journalist (Moscow): "Collision With Prestige"]

[Text] A Good Beginning

In April 1962 a directive was adopted which set for domestic scientists and designers the following task: in the interests of the metallurgical industry "to develop economical technological processes, machines and installations for waste free cutting of metal." There was good reason for this since up to this point, according to data of the USSR Central Statistical Administration, the country annually loses about 8 million tons of metal in shavings.

In order to carry out the task that was set, it was necessary to go beyond the framework of customary ideas. And this was done by specialists of the Kharkov aviation STUZ (KhAI). They came to the conclusion that it was best to cut metal that had not yet hardened, firing a cutting edge into it. In passing it was explained that this explosion-impulse technology produces additional possibilities. If one replaces metal cutters with compression molds and bombards the metal shavings with them, one can obtain billets with better density than are obtained with smelting: the shavings simply burn.

A technical snag was also revealed in the first stage of the work. It consisted in that it is impossible either to cut or to form metal with the usual one-sided bombardment from a single point: in the words of the metallurgists, "the axle of the billet is shifted." The Kharkov workers solved this problem too: a symmetrical two-sided doublet not only doubled the efficiency factor of the device and made it more compact, but the main thing is that it made it stable at the most important moment. There was no longer a need to construct a heavy and cumbersome foundation. And it became possible to build a relatively light aggregate into technological lines and, if necessary, move it without any restructuring in the shops.

In the blast chamber one uses diesel fuel, gasoline or gas which burn immediately, and this makes the technology harmless to the environment. And remote control which makes it possible to remove the personnel from the working zone has made the installation even safer. As distinct from its predecessor--

machines for gas (or fire) cutting--the new design has also turned out to be simple and convenient for repair workers.

Such are the merits, heretofore unknown in world metallurgical practice, that are inherent in the machine for impulse cutting (MIR). It is no wonder that the invention had been protected with 50 authors' certificates and, in addition to this, by patents in eleven foreign countries (the United States, Sweden, France, Italy, Belgium, Canada and so forth).

The Machine Has Come

The MIR installation first appeared on the technological lines for continuous casting of the Sibelektrostal' plant (Krasnoyarsk) in 1964. The plant workers were interested in the innovation. They also made their inventive contribution to the improvement of the machine. And it, as it were, had arrived.

Six years later the new installation was being used successfully at the Sarakanays metallurgs plant (Liypaya, Latvian SSR). As soon as the news of the successful operation of the impulse cutting machine began to spread among engineers, requests poured into the State Committee for Inventions and Discoveries from metallurgical plants, design bureaus, planning and research organizations under the most varied departmental jurisdiction. One list of these letters alone takes up 15 typewritten pages: from 1965 through 1971 almost 800 of these requests were made.

There is now a need for a state evaluation of the innovation.

Testing of existing impulse cutting machines has been conducted by the inter-departmental commission made up of representatives of the USSR Ministry of VUZ's (the KhAI is under its jurisdiction), the Ministry of Heavy Machine Building and the Ministry of Ferrous Metallurgy. The state commission recommended to machine builders series production that provides metallurgists with extensive utilization of the design of the MIR.

This decision promised a weighty national economic effect, which is shown by the reference of the State Committee for Inventions and Discoveries: "when the continuous steel casting lines that are operating in the country are equipped with MIR machines one will be able to save up to 200,000 tons of metal annually and to achieve an economic effect of up to 10 million rubles."

Defending Its Prestige

On 17 May 1973 the All-Union Scientific Research Institute of Metallurgical Machine Building (VNIIMETMASH), the head institute in the USSR Ministry of Heavy Machine Building, sent a request to the Sarakanays metallurgs plant which was essentially a directive letter. Try to grasp the meaning of the concluding words: "Thus the MIR machines have no advantages over the hydraulic cutters which can compensate for their shortcomings and serve as any justification for using them The most technically and economically justified and promising means of cutting billets . . . at the present time are hydraulic cutters."

✓ But as long as the criterion for truth is practiced the opinion of the plant workers is the most valuable. Here is what the director of Sarakanays metallurgy has to say:

"The quality of the cutting is good," said N. N. Golodov about the operation of hydraulic cutters which at that time were also being tested at his plant. But he also wrote this: "But the high-pressure pumps frequently break down and they practically cannot be repaired For working fluid in the hydraulic system of the cutters one uses a combustible mineral oil and since they are used in a hot environment with a temperature of the metal being 750-800 degrees centigrade, there is the possibility of fire, which becomes worse under the working pressure of the liquid (300 atmospheres)."

The "inquiry" contains a number of technical details. Let us give one of them: "According to our information," write its inquisitive authors, "when the MIR is in operation at your plant there is frequent breakdown of the roller conveyor bearings that adjoin the MIR."

We did not manage to discover any traces of such complaints. Moreover we found a document that said something quite different.

B. Ye. Kurakin, the chairman of the all-union Litsenzingtorg association--to the USSR deputy minister of higher and secondary specialized education, N. F. Krasnov: "This is to inform you that the license agreement for impulse cutting of metal which was concluded on 9 December 1970 between the Litsenzingtorg all-union production association, Moscow, and the Demag AG firm, Duisburg, FRG, had a term of five years, which expired on 9 December 1975. We wish to extend the firm's immense gratitude to the Soviet specialists."

One can hardly find a more objective opinion than that of a client. In the manufacturing branch they have not listened to this opinion. "The plant must agree with the suggestion of VNIIMETMASH only because the delivery dates for MIR machines have regularly been missed since 1975 and since that time correspondence has been continued with the Ministry of Heavy Machine Building regarding this issue, and VNIIMETMASH has committed itself to delivering hydraulic cutters that are manufactured by its experimental production . . ." wrote the director, N. N. Golodov.

There is nothing else to say here: power devices have been put into motion. Obviously they have cut off the channel for the arrival of sets of equipment of the MIR type in Liyepaya. This supposition is confirmed by a notice from the State Committee for Inventions and Discoveries: "In January 1978, under the established policy Soyuztyazhmashkomplekt issued an order for the delivery of 20 MIR-150 machines by the Southern Ural Machine Building Plant. But the Southern Ural Machine Building Plant did not conclude an agreement for the manufacture of the machine and did not deliver them to the Sarakanays metallurgy plant."

A competition between two ideas, which is quite normal in scientific and technical practice, ended up in a conflict of an uncreative nature. The inventors of the hydraulic cutters could in no way control the temptation to

take advantage of their intradepartmental authority. Nothing else could have explained, for example, the demarche: "The VNIIMETMASH again insists on the most rapid assimilation by the Sarakanays metallurgs metallurgical plant of hydraulic cutters, for which it is necessary to override the decision of the Soyuzmetallurgmash all-union production association concerning the manufacture at the Southern Ural Machine Building Plant of 20 MIR's, and instead they are to manufacture at the Southern Ural Machine Building Plant hydraulic cutters with a delivery date in 1980-1981."

Thus the cutters of the competitors who were highest up in the manufacturing branch cut the plan for the MIR off from the base for producing machines of this type. And a situation was created which can accurately be defined by the proverb: "The tale wags the cat."

Imaginary Failure

One must recognize, however, that the Liyepaya metallurgists still managed to counteract departmental pressure.

"We managed," the plant director told me, "in addition to the already existing 20 machines, to produce 4 more impulse machines. In the near future we hope to obtain 4 more"

It turns out that for almost 10 years, because of conscience rather than fear, as it were, the director and specialists of the enterprise in Liyepaya have been struggling with the institute which has the greatest authority and influence in metallurgical machine building. And they are putting out one machine after another: in my opinion, this fact is a clear response to the kind of machine metallurgists need.

Another aspect of this story is clear at the enterprise that manufactures the new machines--the Southern Ural Machine Building Plant. The requirements included in the design of the MIR for fineness of processing, precision of the manufacture of the parts, durability, kinds of materials and thermal processing turned out to be greater than the enterprise was capable of. The manufacture of machines became possible after serious reworking of the plan . . . in order to improve the operational and repair specifications. This was recognized by the plant's head designer, V. V. Metveyev.

But why did this happen? All because no one helped the Southern Ural Machine Building Plant to arrange technology. But there is someone to do this. Is this not why immense scientific and design forces were concentrated in the VNIIMETMASH and the laboratory-production base was created?

This is how complicated human relations are: a couple of years ago I had the pleasure of discussing in detail in LITERATURNAYA GAZETA the phenomenal success of the VNIIMETMASH institute which had become a European sensation. It was this very institute that designed a unique stamping press with a power of 65,000 tons which was manufactured at the Novokramatorsk machine building plant, and specialists of Zagranstroy montazh released it in a state of complete readiness in the French city of Issoire. Its design won an international competition. In the Paris newspapers and magazines this press was

called the "machine of the age." This success is far from the only one to the credit of the VNIIMETMASH design school.

And here it turns out that this same leading institute, under the cover of its actually earned authority, can use its intradepartmental influence in order to call the success of a competing design a failure. The more so since the success belongs to specialists from an "alien" branch. Here it is defending its own prestige at the expense of savings in the national economy.

Of course in invention work one cannot avoid conflicts between convictions and prejudices and between authorities that exist in the branches and the uninitiated--"aliens." In a word, one cannot avoid a flaring up of passions. And it is impossible to penetrate through them without a reliable reference point. There is no doubt that the main reference point should be the need of those for whom the new technical equipment is created. Economic expediency also directs us to this reference point: only in the hands of the user is a scientific and technical achievement capable of producing a national economic effect. It is precisely this point of view that made it possible, as I understand it, for the triple state commission made up of representatives of the Ministry of VUZ's, the Ministry of Heavy Machine Building and the Ministry of Ferrous Metallurgy to give the "green light" to the MIR plan.

The problem is that the decision of this commission was only a recommendation, and perhaps in some cases such decisions should be given directive force? The kind of force that is inherent in assignments of the state plan. For the fate of national economic plans themselves depends largely on progressive updating of technical equipment and production technology.

Twenty Years Later

Understandably, it is not simple to adopt a directive concerning the introduction of a specific invention. It is not enough to evaluate its innovation and effectiveness. It is also necessary to find the resources that are used for its introduction. Moreover, one must redistribute them. None of this was done.

And if things had turned out differently I have no doubt that the creators of the "machine of the age" would have been quite capable of delivering the head designer of the Southern Ural Machine Building Plant and his colleagues of their difficult fate--to make an excellent design worse, and deliver the managers of the Sarakanays metallurgs plant of a large amount of trouble in "removing" the machines.

And so impulse cutting machines have still remained at the level of an experimental series. They have survived only with the Liyepaya metallurgists, and the rest have been left almost alone in steel smelting plants of the country. And of course they do not operate without breakdowns, which is inevitable in the pre-series stage of the production of machines.

Incidentally, there are more and more comrades who think such a situation is inevitable. They call themselves realists, throw up their hands and say:

"Since we have given the head institutes monopolistic authority, this means that the country will pay excessively for the honor of the uniform of these branch authorities."

But is this really inevitable?

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DILEMMA POSED BY ALCOHOLIC TRUANT WHO IS OTHERWISE GOOD WORKER

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[Article: "Is Compromise Possible?"]

[Text] A forge operator by the name of Sizykh was a remarkable figure in the instrument shop of one Chelyabinsk plant. He is a modest and peaceful man. He is distinguished by his mastery and efficiency. No one could recall a case when he would refuse a request for assistance. No complaints came from his family.

One serious shortcoming was to found in Sizykh--his passion for alcohol. Each month payday was followed by a drunk. He was never known to be rowdy, to end up in the drunk tank or to act like a hooligan. But his absenteeism was regular. They have conducted educational work with the forge operator, punished him administratively and materially, and judged him in the comrade's court. He has recognized his guilt, repented, agreed with the punishments, and promised to improve. But he did not keep his word. If he was punished too severely, after the "criticism" he would go on a "short" drunk--two or three days. It is clear why they did not fire him--because of his mastery and his self-sacrifice at the end of the month, when the "plan is dragged out."

But still their patience came to an end. Sizykh was fired. He was replaced by a new person and then by another one, and then by another one. All of them together could not fulfill the plan for procurements. The next month there was again a failure to fulfill it. The plant was on the brink of failure, which had not happened to it for many years. After analyzing variants they selected one: to proceed toward reconciliation and ask Sizykh to return. He did not need to be persuaded very much. But there were no changes: a five-day absence after payday and also a two-day absence after "criticism" in the shop committee. During this period a new person was appointed chief of the instrument shop.

What would you have done in his position? This is the assignment for the practical work session.

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QUIZ TESTS READERS ON ECONOMIC THEMES IN RUSSIAN, SOVIET LITERATURE

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[Article: "On Economics From Russian and Soviet Literature"]

[Text] I. An example of what we would now call technical and economic justification for the construction of a new industrial facility is presented by a writer in one of his stories:

"I was already familiar with the coal in your land and found that, because of its poor quality, it was not even worth digging up. Even if it had been three times as good it still would not be worth bothering with. In addition to the quality of the coal I am impressed by the complete lack of demand for it. Your neighbor, the coal miner Altapov, has prepared 15 million poods and yet nobody would give him even 1 kopeck per pood. The Donets hard coal railroad, which goes through your property, was constructed especially for shipping hard coal, but it turns out that during the entire time of its existence it has not yet shipped a single pood I make bold to add that your economy is so disorganized and neglected that coal mining or any innovation at all would be a luxury."

Where is the justification given here? Is it a correct one?

2. The torments of selecting variants for investing existing funds and also the certain degree of risk are shown in the following excerpt:

"On the third day only three kopecks of my previous wealth remained Three kopecks! I gave over to tragic contemplation of this: to waste them on a half a pack of cigarettes or to wait until hunger becomes unbearable and then purchase bread with them? Since I was intelligent, I decided on the latter!"

From where was this description taken and wherein lay the risk?

3. Production administration consists of a multitude of functions. A well-known writer writes eloquently in a fable about how disastrous it is to carry out only one of them, particularly planning, while ignoring others, for example, the implementation of what has been planned:

"A peasant came up to the garden to steal cucumbers. He crawled up to the cucumbers and thought: 'I will take a bag of cucumbers and sell them. With this money I will buy a pullet. It will lay eggs for me, sit on the nest and provide many chickens, which I will sell and purchase a piglet--a pig; the pig will give me piglets. I will sell the piglets and purchase a filly; the filly will give me colts. I will feed the colts and sell them; and I will buy a house and keep a garden. I will keep a garden and plant cucumbers, and let nobody steal them for I will keep a strong guard. I will hire the guards and station them by the cucumbers and then I myself will sneak up and shout: 'Hey you!'"

How did the peasant keep himself from carrying out his plan? And who was the author of the fable?

4. The development of urban transportation is not only a matter for municipal services, but also for industrial enterprises. We have recognized this today and even discuss it. But this was written about long before the war:

"After about two months Gavrilin called an engineer into his office and said to him: 'I have made a little plan. One thing is clear to me, that there is no money, and a trolley is not a small thing--you cannot buy one for three rubles. It is necessary to build a material base here. What is the practical solution? A joint stock company! And what else? With interest. Will the trolley pay for itself within a couple of years? From the day three lines of the first section go into operation . . . we will be counting in the tens. Now--a shareholding company. Who will be included? The food trust, the oil trust. Do the rope plant workers need a trolley? Yes, they need one! We shall send cargo cars to the train station. This means, the rope plant workers! The People's Commissariat of Railroads will perhaps give us a little. Well, and the province ispolkom will give us some. This is already a commitment. And once we begin--the Gosbank and the Kombank will give us a loan."

In what work do we find this solution to the problem of urban transportation?

5. The technology for performing work, individual operations, working and recreation conditions, and the orientation toward the most rapid achievement of the final results--all this is described by a child for whom the trousers he longs for are being sewn out of a mysterious "whirr":

"The 'Singer' sewing machine whirred. The old woman turns the handle. She turns it cautiously, as if she is holding her breath, she thinks about her next actions, and suddenly she starts the wheel and lets it go so that the handle becomes invisible it is spinning so fast. It seems to me that now the machine will sew all of the trousers in a moment. But the old lady puts her hand on the sparkling wheel, slows the machine down, stops its whirring, and when the machine stops she bites off the thread with her teeth, places the material on her chest and looks at it attentively to make sure that the needle will go through the material and that the seam was not crooked."

In what work was this technological process described in detail? What requirement for working and resting conditions was violated for the sake of accelerating the final result?

6. Certain shortcomings of the time-rate form of payment for labor are clearly presented by the writer in this monologue:

"... they do not want to take my work into account in any way. If I spend a day in the forging shop--they enter one working day. Whether I work there or whether I rolled cigars--it doesn't make any difference to them! I could do five day's worth of work in one day in the repair shop--and still they enter one day! You can break your back with a sledge hammer and still they will not pay you for more than one working day. So with your pay, buddy, you will not get terribly fat, you will stay alive, but you will not want to get married!"

Whose monologue is this and where is it from?

7. A writer has depicted the complexity of determining the brigade assignment in this story:

"... the carpenters, seven of them, received an advance (they put up a rural store) and after work they went to the coffee shop They each drank three glasses of tea and began to talk about the fact that they would still like to complain about the counter. The fact is that when they were bargaining for the price they lost sight of the counter: should the carpenters construct it, or is this really joiners' work? The general store clients had forgotten about this, and the carpenters were then silent (their brigade leader was an expert in this matter). It now became clear that the rural store clients wanted the carpenters to construct the counter as well; it turns out that they had in mind that it goes without saying, and so forth and so on. But this point was not included in the agreement, and the carpenters began to 'make a fuss': the counter is not our job! That is, of course, they could make it, but they should be paid separately for this. 'I will show them the reference book,' a clear threat came from the brigade leader, a dried-up peasant who was black from the sun"

But however that may be it is necessary to come to an agreement beforehand, before the contract is concluded. Where is this written about?

8. A preliminary sketch of the program for questioning workers about their work qualities is contained in one of I. S. Turgenev's works:

"Ask each house serf in the following way: how much income did you receive per year--what was your job--and how much did you spend--and? And from his answers you can decide whether the house serf was either useful or satisfactory; do not keep him without this."

Where is this not altogether correct suggestion made? For it is hardly correct to evaluate the worker just from what he thinks about himself

9. A well-known principle of "time-money" is expressed in the monologue:

"And suddenly a moment has come to you when time no longer hurries. Your bride has also let go of it, and money, the main thing--money, the dowry worth almost 3 million slips through your fingers."

Who recites this monologue and in which novel?

10. Two poets who knew each other well and respected each other wrote about the place of forced and free labor on the scale of social values. Here are their words:

"Work; work, work:
You will break your back
At long and honorable work
At long and honorable labor . . ."

"That great joy -- work
In fields, in shop, at desk!
Work until covered with sweat
Work without thinking of self
All happiness of the earth -- comes with labor!"

Who wrote the lines presented above?

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BOOK INCLUDES CONTRIBUTIONS FROM 100 AUTHORS ON INDUSTRIAL PSYCHOLOGY

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[Review by V. N. Gyuppenen, deputy head engineer of the Kurganpribor Production Association (Kurgan), of the book "Psikhologicheskiye problemy povysheniya effektivnosti deyatel'nosti proizvodstvennykh kollektivov" [Psychological Problems of Increasing the Effectiveness of the Activity of Production Collectives] (Theses of papers of scientific and practical conference), ed. by O. I. Zotova, candidate of psychological sciences, Ye. V. Taranov, candidate of psychological sciences, and Ye. V. Shorokhova, doctor of psychological sciences, Kurgan, 1981, 271 pages]

[Text] It is becoming a less rare event when at the base of an industrial enterprise scientific and practical conferences are held on such a discipline as psychology, which would seem to be remote from production. The materials of one of these conferences, organized with the active participation of the Kurganpribor association, have been published in a book. It includes 81 articles by approximately 100 authors. Five sections are devoted to problems of the psychological service of the enterprise, socio-psychological aspects of management and administration, brigade methods of labor organization, the role of the individual in increasing the efficiency of the work of the collective, and methods of investigating the collective and the individual.

Recently managers of enterprises have been turning more and more to the social factors of production. A well-known example, is provided by the general director of the Kurganpribor association, Ye. V. Taranov, candidate of psychological sciences, on whose initiative the conference was held. Incidentally, the association was appointed to be the co-worker on the subject, "Development of Scientific Fundamentals of the Psychological Service in a Developed Socialist Society," which is being carried out by the Institute of Psychology of the USSR Academy of Sciences. The specific task is to develop scientific bases for the psychological subdivision of the production organization. This is the question to which Ye. V. Taranov's paper at the conference was devoted.

In order to describe the collection one must first decide who to single out. To what should the reader's attention be directed first so that he will be better oriented when he takes up this fairly large book? We shall discuss a couple of the theses.

In the paper of the secretary of the party committee of Kurganpribor, A. I. Yevtushenko, he shows how in practice one meets the requirement of combining political and economic work in the collective and how the party organization deals with the management so that they will be able to foresee and take into account the moral and psychological consequences of the economic and administrative decisions they make. The paper is accompanied by practical examples.

The Leningrad social psychologists, V. Ye. Semenov and L. V. Faustova, relying on their research at industrial enterprises of the city, formulate functions which must be carried out by the psychological service: research, organizational-administrative, informational, educational and consultative. Only a combination of these can produce the expected result. Specialists know how debatable this subject is and how important it is to define it. The paper by Ye. V. Taranov gives a largely similar opinion.

G. I. Khoroshev discussed the interesting experience of the Cheboksary Prompribor production association. This association has developed and has begun to apply an integral indicator of personnel work which is evaluated in terms of 12 indicators: the level of labor discipline, observance of social order by members of the collective, labor turnover, the condition of work with young specialists, training and advancing skills of personnel, fulfillment of plans for social development, efficiency of work with letters and complaints, and so forth. Each characteristic is measured according to a special formula. It should be noted that the integral evaluation is used not simply for the sake of accounting, but it has demonstrated its practical effectiveness. While in 1975, before its introduction, labor turnover amounted to 22 percent, in 1979 it was 11 percent, violations of labor discipline per 100 workers were 6 and 2.85, respectively, production volume increased by 32.8 percent, and labor productivity--by 28.4 percent.

The sociologists V. V. Novikov and E. N. Fetisov discuss the control of the adaptation of newcomers in the AvtoZIL production association. The system of occupational advancement and adaptation of newcomers applies to all workers up to 30 years of age who are hired and includes five main stages of work: hiring, the first month of work, six months, the first year, and the second year of work. The process of adaptation in each stage is reflected in a "card catalogue of adaptation and occupational advancement of the newly hired young worker" which has been especially developed for this purpose. From 1976 through 1980 labor turnover in the subdivisions that have embraced this system decreased by one-fourth, truancy--by 7.6 percent, and violations of social order--by 56.4 percent.

Attention is drawn to the diversity of papers on the psychology of management. Social psychologists from Leningrad, A. A. Govorova, N. A. Il'ina and A. A. Rusalina, for example, discuss how they investigated the significance of the personal example of the manager for his subordinates at a number of enterprises. Thus if the manager does not drink alcohol and his subordinates are well aware of this, their inclination to liquor decreases significantly, and this is true during non-working time as well. On the whole a positive example from the manager is transferred much less strongly than a negative one. This is a confirmation of the folk wisdom, that a bad example is contagious.

A. A. Zhuravleva shows in her discussion the great importance of knowing the prospects for growth for efficient activity of engineering and technical personnel and employees. This is confirmed by research conducted in 1978-1979 at the experimental repair-mechanics plant of the Mosremstroy mash production association. The less they know about the prospects for advancement, improvement of working conditions and the receipt of certain benefits from the enterprise, the greater the turnover. Certain critical periods have been established: the entry into a position--the first half year of work; the transition to the stage of optimal productivity--2.5-3 years; the appearance of certain signs of reduced productivity--after 7-8 years.

In order to characterize the subject matter of the research of social psychologists, one can give several figures from the report of the Leningrad psychologists N. V. Grishina and A. Yu. Shalyto, who have studied the attitudes of 200 workers toward labor on two shifts. On the whole we know that people prefer to do their own work on the first shift and be free. This is how this appears concretely: 18.8 percent of those questioned have a positive attitude toward working two shifts, 58.5 percent--a negative attitude, 12.8 percent--an uncertain attitude, and 9.9 percent, an equivocal attitude. It is curious that those who accept such a schedule are the ones who are already working on two shifts, and those who have not worked on two shifts, primarily youth, are strongly against it. Before the research, however, the hypothesis was the opposite. Even from school it is clear that some prefer to study on the first shift, while others prefer the second shift. Consequently, youth are not sufficiently informed about the fact that a two-shift work schedule has its advantages.

Among the interesting and useful articles are those of V. I. Antonyuk and G. A. Mochenov (Moscow Institute of the National Economy imeni G. V. Plekhanov) about the distorted evaluation of the load on scientific workers of scientific production associations in agriculture, vegetable bases and construction sites. S. M. Shalyutin--about the fact that the quality of documents prepared by the manager depends on how well he has mastered logic; A. V. Filippov--on the evaluation of the activity of the manager in 7 different situations (provision with material and labor resources, attitude of personnel toward work, attitude of the manager toward his subordinates, and so forth); A. L. Svetsitskiy (Leningrad State University imeni A. A. Zhdanov)--about the importance of satisfaction with work in increasing its efficiency, and so forth.

For example, research conducted by the Moscow Institute of the National Economy imeni G. V. Plekhanov showed that assistance given by scientific workers and engineers to agriculture, vegetable bases and construction projects occupy only 8 percent of the time during which they are absent from work (business trips, illness, leave with permission from the administration, training and so forth). The investigation, which included 50 engineering and technical personnel, 50 mathematics students of the third course and 50 students of other specialties of the third course produced the following data: they do not have any idea of the existence of rules for logical conclusions--98 percent, 22 percent, and 100 percent, respectively; they cannot give examples of rules for conclusions--100 percent, 34 percent, and 100 percent; they discover without prompting a simple mistake in a syllogism (without knowing the

rule)--46 percent, 62 percent and 50 percent. Such is the significance of a knowledge and study of logic which was demonstrated by S. M. Shalyutin.

It seems that a reader who is familiar with the book will find its subject matter interesting, will gain a clearer idea of which institutions deal with the subject matter, and will meet interesting authors.

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TEN BOOKS ON SOCIAL, ECONOMIC PROBLEMS OF LABOR REVIEWED

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[Article by B. P. Kutyrev, candidate of economic sciences (Novosibirsk): "Ten Books on Socio-Economic Problems of Labor"]

[Text] Results of Social Planning Summed Up

Toshchenko, Zh.T., "Sotsial'noye planirovaniye v SSSR" [Social Planning in the USSR], Moscow, Politizdat, 1981, 320 pages.

About 15 years ago scientific and popular literature was filled with works devoted to problems of social planning. A solid stockpile of monographs, collections and articles have accumulated. Zh. T. Toshchenko makes an attempt to generalize them. He discusses the rise of social planning, its essence, its main kinds, forms, levels, sections and so forth. He devotes a certain amount of space to such questions as the construction of a tree of goals and the development of special-purpose programs. He gives a good deal of information about the experience of enterprises, branches, cities and regions. In a word, it is useful for specialists and practical workers to delve once again into the suggestions, discussions, discoveries, predictions, methodological aspects and methods of one of the largest mass initiatives of the past two decades--planning social development. The book reflects the condition of theory like a mirror and tries to explain many social processes that are taking place in our society.

From Planning the Development of the Collective--To the Branch

"Sotsial'noye planirovaniye v otrasli. Nekotoryye voprosy metodologii" [Social Planning in the Branch. Several Questions of Methodology], ed. by V. R. Polovov, Leningrad, "Nauka", 1981, 160 pages.

Planning social development began with the level of the collectives of the enterprises. Subsequently it began to be extended to other objects--branches and territories. These objects have a good deal in common, which is natural since the same specialists developed the methodology of the social plan of the collectives, branches, cities and regions. But this planning also has its peculiarities. It is precisely these peculiarities which is the subject of the author's attention in the book which is being recommended. It shows the

specific features of the branch as an object of social planning and its typical goals. It seems that such attempts are necessary since the party and government decree of 12 July 1979 determined the development of comprehensive divisions for social development to be mandatory for all levels of administration.

Cities in Comparison

Dmitriyev, A. V., Mezhevich, M. N., "SSSR - SShA: sotsial'noye razvitiye v gorodakh. Opyt sravnitel'nogo analiza" [The USSR and the United States: Social Development in the Cities. An Experiment in Comparative Analysis], Leningrad, "Nauka", 1981, 176 pages.

Social problems of cities have occupied an important place in the subject matter of scientific research. Their urgency is unquestioned, and the need for a solution is insistence. Among the work of urban experts there are those that are based on a comparative analysis. In the experience of other countries, in this case the United States, there are both negative and positive aspects which it is expedient to take into account when planning the development of our cities. The authors show the differences in the way of life of the city dwellers and in the social development of the cities of the USSR and the United States. The experience in planning the social development of Leningrad which is shown here is of interest. The group of problems that must be required is presented fairly well, but it is obvious that this is a task for subsequent work. It is to the author's credit that he has substantiated the need for formulating a number of specific problems.

Where Does the Labor Collective Begin?

Gramov, V. M. Korytov, K. B., "Upravleniye trudovym kollektivom" [Administration of the Labor Collective], Moscow, Politizdat, 1981, 288 pages.

After the USSR Constitution reinforced the increased role of labor collectives in administrative processes, a number of publications appeared on this subject. This book, which was written by party workers, is largely typical. It gives a number of fairly well-known problems and gives examples from practice. But it also brings in a number of unusual or less well-accepted assertions. For instance the authors are in favor of planning . . . conflicts. The main thing, however, is that the authors clearly establish where the labor collective begins--with common demands, interests and stimuli. The first section of the book is devoted to this. The other two sections discuss administration of the collective and its self-administration.

The Organization is Becoming a Decisive Unit

Prigozhin, A. I. "Sotsiologiya organizatsii" [Sociology of the Organization], Moscow, "Nauka", 1981, 257 pages.

The scientific foundation of the sociology of the organization (enterprise, institution) is just being laid, and one of the "bricks" in it is the work of A. I. Prigozhin, edited by academician D. M. Gvishiana, which was approved

for publication by the All-Union Scientific Research Institute of System Research of the USSR State Committee for Science and Technology and the USSR Academy of Sciences. It discusses: the subject of sociology of the organization, the organization as a social phenomenon, the construction of organizations, and their control and development. Although the subject matter is "dry" in itself, the book is attractive because it touches on interesting problems and gives curious illustrations from domestic and foreign experience.

That Productive Administrative Labor

Sil'chenkov, A. F., "Povysheniye effektivnosti upravlencheskogo truda. Metodologicheskiye aspekty" [Increasing the Effectiveness of Administrative Work. Methodological Aspects], Moscow, "Ekonomika", 1981, 128 pages.

Many attempts to increase the effectiveness of the labor of the manager or the rank-and-file specialist have failed because of poor incentives which, in turn, arise from the inability to evaluate their labor. Evidence of this is the argument in which certain people assert that specialists are not paid enough while others assert that their wages should not be increased. The author begins the book with precisely this issue. The analysis he has conducted shows how far we are from solving the problem of administrative labor. Therefore any attempts in this area deserve attention and support. Incidentally, already existing experience can be used, and not only for engineering and technical personnel, employees and managers, but also for workers (for instance, when distributing brigade earnings in terms of the coefficient of labor participation).

He Has Received an Education--But the Raise? . . .

Rozenbaum, Ye. A., "Podgotovka upravlencheskikh kadrov. Organizatsionno-Pravovyye voprosy" [Training of Administrative Personnel. Organizational and Legal Issues], Moscow, "Nauka", 1981, 189 pages.

Why do people study? The question might seem trivial, but only at first glance. A good deal depends on the answer to it. The author objects to the idea that increasing the qualifications of management personnel has necessarily led to job advancement which, in his opinion, is a kind of incentive. Increased qualifications "are primarily a necessary condition for further development of public production and improvement of state administration in the interests of the entire society, and only then can this act as a means for obtaining certain benefits and advantages" (p 93). It would be interesting to know whether the reader agrees with this? When does this "then" come? The book considers the concept "administrative personnel," their social nature and the requirements placed on them, the main features of training and increasing qualifications, and forms of training personnel. The examples are taken from foreign and Soviet practice.

Prospects of the System of Vocational and Technical Education

"Prognozirovaniye i planirovaniya podgotovki rabochikh kadrov v sisteme proftekhobrazovaniya v svete resheniy XXVI s"yezda KPSS" [Prediction and Planning of Personnel Training in the System of Vocational and Technical Education in Light of the Decisions of the 26th CPSU Congress], Theses of papers given at the kray scientific and practical conference, Krasnoyarsk, 24-26 November 1981, Krasnoyarsk, 1981, 138 pages.

The goal of the system of vocational and technical education is to provide the national economy with highly skilled personnel. But one must take into account the fact that in a certain sense the system of vocational and technical education competes with the secondary schools, tekhnikums and VUZ's. In order to fulfill the plan in terms of the selection, which is becoming more and more difficult, it is necessary to expend a great deal of energy which, naturally, is reflected in the training and educational process. The result is that the quality of the contingent that is graduated is not high enough. This was discussed by the directors of vocational and technical schools who were participating in the conference. How does one overcome this serious contradiction? The collection contains answers to this question, particularly a comprehensive special-purpose program for the development of the system of vocational and technical education of Krasnoyarsk Kray, which was developed by the Krasnoyarsk Pedagogical Institute under the leadership of the kray party committee.

Control of Working Conditions

Makushin, V. G. "Sovershenstvovaniya usloviy truda na promyshlennoykh predpriyatiakh. Sotsial'no-ekonomicheskiye problemy" [Improvement of Working Conditions at Industrial Enterprises. Socio-Economic Problems], Moscow, "Ekonomika", 1981, 216 pages.

The working conditions of the Soviet individual, which are written about by a well-known specialist in this area, occupy an important place among the socio-economic problems. The book is mainly devoted to evaluating the influence of working conditions on the utilization of the labor force. Such an approach, of course, would be one-sided, and therefore the author also considers working conditions from the standpoint of the individual's health, his well-being and his all-around development. The production worker will find primarily a good deal of instructive material in the book, which is suitable for practical work.

Experience in Strengthening Labor Discipline

Kubankov, Ye. S., Orlov, Yu. G., "Kollektiv i distsiplina truda" [The Collective and Labor Discipline], Moscow, "Moskovskiy rabochiy", 1981, 95 pages.

The brochure begins with the description of a tragic event at one Moscow plant--with a drinking bout on the evening shift which ended with one of the drinkers hitting another with a knife. A conclusion is drawn: "The tragedy which took place on the evening shift left none of the workers at the enterprise indifferent." This conclusion, however, causes one to think: it took

an accident to make people think seriously about violations of discipline. The authors describe legislative acts, the administration's fight against violators, existing rights and responsibilities of advanced experience. Additionally, the book raises the question of the degree to which empiricism should prevail in the matter of the development of labor discipline and the degree to which scientific developments are needed.

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SUGGESTIONS FOR DEALING WITH TYPE OF WORKER DISCUSSED ON PAGES 198-199 ABOVE

Novosibirsk EKO: EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA in Russian No 3, Mar 83 (signed to press 26 Jan 83) pp 213-215

[Article: "Is Compromise Possible?"]

[Text] Answer.

The new shop chief invited the forge worker Sizykh in for a conversation. In order for him not to be offended, the chief had conversations with many other shop workers before him. They talked about this and that. Then he asked the question: "Well what next--are we going to continue to be drunk and be absent?" The answer followed immediately: "The way it was is the way it will be. I will not give up drinking. It is a system for me, a law of life!" "But one cannot violate the laws of production!" replied the shop chief. "Everything will be in order, one will not contradict the other," the worker assured him as he left.

Ten days passed and after payday Sizykh came to the shop chief and asked for five days off. Having dickered a little, they agreed on four. Four days later the forge worker appeared as if nothing had happened and continued to work successfully. The shop chief visited him at home and talked with his wife. Sizykh is a peaceful man: he drinks, eats and goes to sleep. Essentially he does not have drunks, but "rest periods," if one might put it that way.

There followed three agreements for four days off and then an attempt to change over to a three-day "leave." Encouraged by success, the shop chief brought the conversation around to a two-day maximum, but encountered insurmountable resistance. From the behavior of the worker one can draw a conclusion about how useless it is to make demands. It required great efforts to placate him, and they agreed to leave the matter where it was. Two years passed after that. The agreements were fulfilled, but still the new shop chief was not sure that he had acted correctly.

Respect the Man, Comments from a Physician Specializing in Narcotics

The small article, "Is Compromise Possible?" gave an impressive picture of the administrative sluggishness and ignorance which is manifested by certain

managers with respect to the fates of alcoholics who have ended up, unfortunately, under their jurisdiction. To deceive the ill person and his family (approve of drunks), to deceive the state and the labor collective (masking truancy as "leaves") and finally the self-deceit of the chief (the possibility of fulfilling the plan by exhausting the forces of the person who has been defeated by an enemy)--all this is almost presented as a formula for production commanders.

The new shop chief displays no knowledge about the clinical symptoms of alcoholism, about the patterns of behavior of people who are suffering from this enemy, not to mention modern methods of helping alcoholics and the existence of a developing system of institutions and services for help against alcohol. His judgments are outdated: none of the personnel even has the suspicion of the possibility that other workers will be affected by the disease of alcoholism. What is the solution? One can send any person to a work therapy preventive medicine sanatorium. As a rule, experienced and self-sacrificing specialists, physicians and educators, work in work-therapy preventive medicine institutions. But the problem is that executives and activists in social organizations frequently select out of all the multifaceted institutions for specialized anti-alcohol treatment precisely the work therapy preventive medicine sanatorium, without going for assistance to alcoholic advisors and offices of alcoholism, and steering clear of out-patient methods of treating alcoholism. They place their hopes in compulsory therapy alone, and therefore, as a rule, they send to the preventive therapy institutions alcoholics who have been driven out of production, where they have been told that they are being treated "as a punishment." So they see the treatment and inspire each other: we shall serve our time and then we will drink some more. And the forge operator Sizykh, under the destructive influence of the alcoholic disease, will also be sent to a work-therapy preventive medicine institution sooner or later.

In many cases there is a more effective way. For example, at the Chernorechensk cement plant, as in a number of other enterprises of the city of Iskitim in Novosibirsk Oblast there are points for medical assistance with addictive drugs, which are operating successfully under the unified management of the rayon physician who is in charge of addictive substances. In these points the alcoholics can be treated without leave from work, medics are indispensable participants in all anti-alcohol measures, and they, in turn, are directed not so much toward punishing the drunks as toward explaining to them the desirability of evading their enemy. The points handle alcoholics who under any other conditions would be turned away from the gates of the plant or sent to fill the ranks of patients at the work therapy preventive medical institutions. At this same Chernorechensk plant we have managed to largely change the view of the some of the administrators who still think in the old way. There will never be a shortage of voluntary assistants in this noble cause.

As early as the beginning of the 20th century the great psychiatrist, V. M. Bekhterev, asserted that drunkenness is a disease and it is possible and necessary to help the alcoholic. To do this, as the humanist-physician pointed out, it is necessary first of all to "understand his personality."

In a word, the solution to the problem presented at the practical seminar is as old as the world: if you want to achieve success learn to respect the individual.

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ANSWERS TO THE QUIZ ON PAGES 200-203 ABOVE

Novosibirsk EKO: EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA in Russian No 3, Mar 83 (signed to press 26 Jan 83) pp 216-217

[Article: "On Economics From Russian and Soviet Literature"]

[Text] Answers

1. The "technical and economic substantiation" that was presented is from a letter from a bankrupt German entrepreneur, Imbs, to an estate owner, Tulupov, from a story by A. P. Chekhov, "Russian Coal (A True Story)" ("Poln. sobr. soch. i pisem." [Complete Collection of Essays and Letters], Moscow, "Nauka", 1975, Vol 3, pp 17-18). "And tell the German," wrote the count in response to the letter, "that he does not understand a thing" (p 18).
2. The torments of deciding where "to invest" three kopecks are shown in the tale "Holy Fool," by A. I. Kuprin ("Sobr. Soch." [Collected Works], Moscow "Khudozhestvennaya literatura", 1957, Vol 1, pp 514-515). The risk consisted in the following: "And suddenly--I thought--will not a pound of bread cost two and half kopecks, or more? Or what will happen if the salesman takes a cut? I understand that one can pay 5-10 rubles in a restaurant and order the waiter: 'Put it on my tab, friend,' but what happens if you are short one kopeck?"
3. In the fable by L. N. Tolstoy, "The Muzhik and the Cucumbers," the hero worked out his plan as follows: ". . . then it came to his mind that he had completely forgotten that he was in somebody else's garden and shouted at the top of his voice. The guards heard him, jumped and beat the peasant" ("Sobr. Soch." [Collected Works], Moscow, "Khudozhestvennaya literatura", 1982, Bol 10, p 21). And indeed: it is not enough to plan and yawn. It is necessary to fulfill the plan!
4. The suggestion to the effect that urban transportation should be maintained by industrial enterprises is found in "The Twelve Chairs" by I. Il'f and Ye. Petrov.
5. The process of an individual sewing industry was depicted by V. Astaf'yev ("The Last Bow," Leningrad, Lenizdat, 1982, p 74). The hero says: "So without dinner we have worked it out to the finest points--I asked the old

lady not to stop because of such trivia as food" (p 74). As we can see, the requirements for conditions of labor and rest were violated

6. The shortcomings of time-rate payment are presented in a monologue by Ippolit Sidorovich Shalyi from the novel by M. A. Sholokhov "Plowed Virgin Land" (Moscow, "Izvestiya", 1965, Vol 2, p 123).

7. The episode with the brigade was described in a story by V. Shukshin, "Dancing Shiva" ("Rasskazy" [Stories], Moscow, "Khudozhestvennaya literatura", 1979, p 281).

8. The sentence that was quoted belongs to "Notes of a Noblewoman" from "One's Own Manorial Office (Excerpt from unpublished novel)" by I. S. Turgenev ("Soch." [Works], "Nauka", 1980, Vol 5, p 11).

9. Alesha is quoted again from the novel by S. M. Dostoevsky, "The Insulted and the Injured" (Leningrad, "Khudozhestvennaya literatura", 1981, p 207).

10. The lines about labor belong: first--to A. A. Blok ("Izbrannoye" [Collection], Leningrad, "Khudozhestvennaya literatura", 1936, p 192) and the second--to V. Ya. Bruysov ("Izbrannyye stikhotvoreniya" [Selected Poems], Moscow, 1952, "Khudozhestvennaya literatura", 1945, Vol 1, p 303).

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MURPHY'S LAW, ASSOCIATED CORROLARIES

Novosibirsk EKO: EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA in Russian No 3, Mar 83 (signed to press 26 Jan 83) pp 218-222

[Article by Artur Blok, translation by L. Belyayeva: "Murphy's Law"]

[Text] The Science of Conferences

Ould and Kan's Law. The effectiveness of a conference is inversely proportional to the number of participants and the time spent.

The Second Law of Committee Dynamics. The less satisfaction you experience from your attendance at a meeting, the more probability there is that you will have to participate in it.

Hendrickson's Law. If the problem requires a number of conferences, in the final analysis they will become more important than the problem.

Faukland's Law. When there is no need to make a decision one should make one.

The First Law of Argument. Never argue with a fool--people might not know the difference between you.

Svippl's Rule of Sequence. The one who shouts loudest is the one who receives satisfaction.

Rayburn's Rule. If you want to live in agreement--agree!

Patton's Law. A good plan today is better than an irreproachable one tomorrow.

The Art of Being a Bookkeeper

Parkinson's First Law. Work takes up all the time allotted for it; its significance and complexity increase in direct proportion to the time spent on doing it.

Parkinson's Second Law. Expenditures strive to equal income.

Parkinson's Law of Delay. "Put it off"--this is the most terrible form of rejection.

Westheimer's Rule. In order to determine how much time a job will take, take the time which in your opinion is necessary, multiply it by two and replace the unit of measurement with a unit of a higher order. Then we can allot two days for one-hour's work.

Graham's Law. Resolve meaningless issues quickly: the important ones you will never resolve.

Gray's Law of Programming. " $n + 1$ " of simple jobs should be planned to take the same amount of time as " n " for the same job.

Reputation of Gray's Law by Logg. " $n + 1$ " of simple jobs requires twice as much time as " n " for these jobs.

The Rule of Time Periods for Fulfilling the Plan (90/90). The first 90 percent of the work takes 10 percent of the time, and the last 10 percent takes the remaining 90 percent of the time.

The Principle of Submitting Orders. Everything necessary for tomorrow's experiment should be ordered no later than tomorrow at dinnertime.

Heop's Law. Nothing is ever built in time or within the limits of the estimate.

Epstein and Heisenberg's Expanded Principle. In the area of research and development it is only possible to determine two of the three parameters at the same time.

1. If a goal and the time for achieving it are set, it is impossible to guess how much it will cost.
2. If the time and resources are limited it is impossible to predict what part of the assignment will be fulfilled.
3. If a goal of research is clearly set and a specific amount of money is allotted, one cannot predict when this goal will be achieved.

If you are lucky and can determine all three parameters precisely this means that you are not doing research and development!

O'Brien's Principle. An inspector always rejects the expenditures if the total figure can be divided by 5 or 10.

Observation of Relative Consumption of Paper Made by Issávi. Each system has its own way of distributing an unlimited quantity of paper: in one they make out gigantic report forms in four copies; in another they paste up immense advertisements and every piece of trivia is packed in four-layer packages.

Juhenna's Law. Compromise is always more expensive than any other alternative.

The Art of Being a Specialist

Weinberg's Consequence. A qualified specialist is the person who successfully avoids small mistakes, steadily moving toward some global error.

Potter's Law. The amount of advertising concerning a product is inversely proportional to its real value.

Roff's Law. Do not describe the previous importance of an idea that is expressed.

Clark's Law of Radical Ideas. Every radical idea--in science, politics and art--evokes three stages of response:

1. "This is impossible and do not take up my time!"
2. "Maybe that is so but it is not worth dealing with . . ."
3. "I have always said that that is an excellent idea!"

Clark's First Law. If an eminent, but already aging scientist asserts that something is possible he is probably correct. If he thinks that something is impossible he is most likely wrong.

Clark's Second Law. The only method of establishing the limits of the possible is to go beyond them into the impossible.

The Rule of the Great. If someone whom you boundlessly admire and respect is lost in especially deep thought it is most probable that the thought is about dinner.

The Law of Seniority. The first variant of a more general principle is always less well thought out than the variant of a particular principle.

Ranemon's Law. There are four types of people: those who sit peacefully and do nothing; those who talk about sitting peacefully and doing nothing; those who do something; and those who talk about the need to do something.

Leva's Second Law. Talent alone cannot overcome a passion for details.

Segal's Law. A person with one watch knows for sure what time it is. A person with several watches is never sure.

Miller's Law. One cannot say anything about the depth of a pond until one has jumped into it.

Wyler's Law. There is no work that a man can do which is must do himself.

Weinberg's Second Law. If builders constructed a building in the same way that programmers write programs the first woodpecker that came along would destroy civilization.

The Art of Being a Person

Coyle's Axiom. The overall sum of reason on the planet is a constant amount, but the population is growing

First Law of Sociogenetics. A passion for the bachelor life is not transmitted through heredity.

Jones' Motto. Friends come and go, but enemies accumulate.

The Fifth Rule. You take yourself too seriously.

Metalaws (Universal Laws)

Persig's Postulate. The number of reasonable hypotheses that explain any given phenomenon is infinite.

Lilly's Metalaw. All laws are imitations of reality.

The Principle of the Final Result. By definition: when you investigate some unknown, you do not know what you will discover.

Cooper's Metalaw. New laws create new loopholes.

Hartley's First Law. It is not difficult to lead a horse to water. But if you make him swim on his back this means that you have achieved something!

Weaver's Law. When several people on business trips take a taxi, the one sitting in the first seat pays for them all.

Doyle's Consequence. Regardless of the number of people on business trips in a taxi and regardless of who has paid, each will include all of the taxi expenses in his expense account.

The Law of Innovation. If you want your team to win the high jump, find one person who can jump 7 feet and not seven people who can jump 1 foot.

Prishman's Paradox. A pipe gives a wise person time to think and gives a fool something to put in his mouth.

Hanson's Commentary on Man. From time to time a man stumbles on the truth, but most frequently he jumps and boldly continues on.

Kheldeyn's Law. The universe is not only more extraordinary than we imagine, it is more extraordinary than we can imagine.

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